The Province of Alberta

PETROLEUM AND NATURAL GAS CONSERVATION BOARD

IN THE MATTER OF THE GAS RESOURCES PRESERVATION ACT

AND IN THE MATTER of a Joint Hearing to determine various questions relating to the proposed Export of Natural Gas from the Province of Alberta.

I. N. McKinnon Esq., Chairman

D. P. Goodall Esq.

Dr. G. W. Govier

Session: December 3rd, 1951.

Volume 26.

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MR.NOLAN: Mr.Chairman, you will remember that when we adjourned we were putting in evidence on behalf of the Northwest Natural Gas Company,and there was certain information requested by the Board, which we have been able to compile and to distribute, and I think that all interested parties have copies of it. I was going to call Mr. Dixon, who would put it on record, and, perhaps, highlight it for the benefit of the Board, and the other applicants. However, as an integral part of our presentation, sir, we are going to ask you now to permit the California Standard Company to give us an estimate of gas reserves. I ask that permission because it really forms a part of my case, my presentation. The brief is very short, and I do not think it will take more than ten minutes to present, and then there will be a witness who will be available for cross-examination.

Now, I do not act for the California Standard Company, and I appear for them this morning without fees to serve them, but if you will permit me, I will ask one of their officers to come forward, and I will introduce him to the Board, and ask him to put his submission on record, and then Mr.Dixon will follow immediately, and that will conclude the evidence which I have to present.

THE CHAIRMAN: Mr. Nolan, with regard to the presentation of the California Standard Company, I think the Board just got that submission on Saturday. Now, we may

want to do some cross-examining, I think, through our counsel, I do not know. Would this witness be available later, and could Mr.Dixon possibly go on first?

MR.NOLAN: Well, Mr. Dixon is available now to go on, and Mr. Dunkley, who will make the presentation on behalf of the California Standard, is here, and he will be available any time that the Board might require him.

THE CHAIRMAN: We have not had an opportunity, really, to go over the exhibit of the California Standard.

MR.NOLAN: Then, I will proceed at once with Mr. Dixon.

THE CHAIRMAN: Yes, if you will, Mr. Nolan.

MR.NOLAN: Might I say to the California gentlemen here that they are excused for today, or should they remain here?

THE CHAIRMAN: We have somebody working on that exhibit now, Mr. Nolan.

MR.NOLAN: Perhaps they had better wait and see what progress we make.

THE CHAIRMAN: Yes.

.....

A FAISON DIXON, recalled, already sworn, examined by Mr. Nolan, testified as follows:-

Q Mr. Dixon, you are still under oath?

A Yes, sir.

Q And when the proceedings were adjourned the week before last, there was certain information which the Board asked you to obtain and to present?

A Yes, sir.

Q Now, I have in my hand a document entitled "Supplementary Data on Natural Gas Supply and Gathering System". Did you prepare that document?

A Yes, sir.

Q Does it contain information which the Board asked you to present to it?

A It does.

MR.NOLAN: Perhaps that could be given a number, Mr. Chairman.

THE CHAIRMAN: Exhibit 74.

SUPPLEMENTARY DATA ON NATURAL GAS SUPPLY AND GATHERING SYSTEM SUBMITTED BY NORTHWEST NATURAL GAS COMPANY, MARKED EXHIBIT 74.

Q MR.NOLAN: Now, Mr.Dixon, will you please give the Board what I might call the highlights of this exhibit, pointing out, if you will, in the first place, what information you were required to obtain, and how you have answered that requirement?

A On the first page of the exhibit there are five different subjects that were asked for in the last Hearing. We then proceed to answer those questions. I do not believe we need to read those as, I believe, it is all self-explanatory.

After page 3 we have the totals of deliverability. Each one of these columns is the summary of the Tables that follow. The first seven columns are totals under the column labelled "Total Contract Amount". The amounts shown in that column are the amounts of gas that would be furnished under the contract. That is true

for the first seventeen years strictly. After that the Canadian Gulf contract does not quite, that field will not quite fulfil the requirements of the contract, and that is made up from the other fields. The 206, which is the sum of the amounts to be derived from the contract, is 13 million less per day than enough to make 80 billion per year, which is the amount we have asked for. We derive this gas, taking it from the additional lands in Princess-Patricia and Dunmore, that are under contract to others than the California Standard. We are taking that in the same proportion as we take the gas from the California Standard. That gives the amount of the 80 billion per year.

In the last years, the last 3 years, we have run slightly above the amounts of the contract, as we have a great deal of gas in the Many Islands and the Princess-Patricia and Dunmore fields, in excess of what is required.

On page 3 we have the. . .

Q Page 3?

A On Page 5 we have the summary of peak day capacities and requirements, which are made up in the same way as Dr. Brokaw has explained. I would like to say that all of these estimates have been made in collaboration with the oil companies themselves.

On Page 6 we have the deliverability schedules of the Many Islands Lake field. I would like you to note, under the column of "Raw Gas Reserves", the

last figure is 328, and that represents the amount of gas that will be left in the ground at the end of 20 years.

On page 7 we have the deliverability schedule for the Princess Basal Colorado field. In the same way there the last column under the "Raw Gas Reserves", is 68 million 590 Mcf.

Q 68,590 Mcf?

A That is in million cubic feet, and represents the reserves that are left there. That is the same for all of these schedules.

It is the same thing for page 8, which is the Princess-Patricia-Sunburst field.

Page 10, or page 9, rather, is the Princess Devonian field. In this case you will note that in the "Net Gas to Pipe Line", we are taking 86%. That is due to 7% of CO_2 in the gas. In the other fields before this we have taken 93% of the raw gas as it comes out of the well, and is gas that will get into the pipe line.

On page 10 is the deliverability schedule of the Dunmore-Bow Island field.

Page 11 is the deliverability schedule of the Dunmore-Ellis field.

Page 12 is the deliverability schedule of the Pincher Creek field.

Now, the total amount of all the gas that will be left in the ground is 788,312 million

cubic feet. That is adding the last figure in the columns under "Raw Gas Reserves".

Following page 12 is a map which is a schematic flow chart for the peak day operations for the 5th year. This has been changed from the map in our other exhibit in order to correspond to the changes made due to the change in design made, due to the contracts that have been entered into. It is all on the pressure base of 15.025.

From page 13 to page 15 is the estimated construction cost, which has been changed from the former exhibit, due to the change in design of the line.

Starting on page 16 is the answer to meeting the requirements of the Canadian Western Natural Gas System. I believe that is all self-explanatory.

When we get to page 18 we have the additional reserves available to Calgary shown there as 1,151 to 1,635 million cubic feet.

Q Billion?

A Billion. No, million cubic feet. Billion cubic feet, pardon me.

Q Yes?

A Now, we have a certain amount of gas that is left in the ground, which I spoke of, of 788 billion, and discounting that to the net marketable gas gives an amount somewhat over 500 billion. I do not know just where to put that, but that is a factor of safety in regard to the amount of gas available to Calgary. I believe the rest of the

A. Faison Dixon,
Dir. Ex,bby Mr. Nolan

description needs no special comment. The local market in Alberta is shown on page 24. As you will note, we have not taken into consideration the very small towns which we do not think can be economically served from any line.

I would like to put into the record, in order to make it complete, a letter from the Britalta Petroleums Limited, and a telegram from the Deep Rock Oil Corporation, to show that they agree with our deliverability schedules.

"Northwest Natural Gas Company,
c/o Mr. A. Faison Dixon,
Palliser Hotel,
Calgary, Alberta. November 29th, 1951.

Gentlemen:

We are advised that you are submitting to the Petroleum & Natural Gas Conservation Board a new "deliverability" schedule adapted to the Many Island Lake Field. A copy of the revised schedule is attached to this letter.

We are in general agreement with the procedure set forth in the schedule, as it is reasonably conformable to our own preliminary studies of the development required in the Many Island Lake Field.

In any event, our intention is to develop and to maintain a gas supply in such available volume that it will at all times meet the demands under our contract with you and in accordance with the Drilling & Production Regulations of the

A. Faison Dixon,
Dir. Ex. by Mr. Nolan

"Oil and Gas Wells Act.

The above is written with the approval of Deep Rock Oil Corporation."

Then there is a copy of a telegram to Mr. S. E. Slipper attached, and it reads as follows:-

"S. E. Slipper, Britalta Petroleums Ltd.
307 Sixth Avenue West, Calgary, Alberta.

I agree with your letter to Northwest Natural Gas Company in regards to deliverabilities of the wells in the Medicine Hat Sand in the Many Island Lake Area and would appreciate your advising Northwest of Deep Rock's approval.

C. A. Houy, Deep Rock Oil Corp."

Q Thank you, Mr. Dixon.

(Go to page 2298)

CROSS-EXAMINATION BY MR. MILVAIN:

MR. MILVAIN: Just two or three questions I would like to ask Mr. Dixon.

Q I notice in looking at this last exhibit that was put in, and particularly at those tables that appear, oh, starting at page 17, numbered Tables 1, 2, 3, 4 and so on. Now, looking at Table 1 in the first column you have the field, for instance, in the one I am looking at it says Bantry-Tilley, next column, Proven and Provable, and the third column is Provable and Possible, and then the distance from Brooks. Now, I am wondering just what is the difference between Proven and Provable.

A Probable, I think. Well, that was gone into at great length in the Hearings before and I do not think it would add anything.

Q Is there a very large difference between them?

A No difference at all, to my mind.

Q No difference at all, I see. And in arriving at what would be the reserves in place that appear in this Table "C", for instance, you wind up with raw gas reserves of 328590. Would that be arrived at after taking into consideration --

A Where is this, please?

Q On Table --

MR. NOLAN: Page 6.

MR. MILVAIN: Yes, page 6 of Table "C".

Q For instance, you show raw gas reserves and the last figure there at the end of 20 years 328590?

A Yes, sir.

Q That is the reserve still left in place after you have taken out that that went before?

A Yes.

Q In arriving at those gas reserves in place, I suppose you have taken those proven and probable reserves as are shown in these other tables we looked at?

A No, that is different. This is different because that was testified to at length by other witnesses using different terminology.

CROSS-EXAMINATION BY MR. MARTLAND:

Q I wonder if I might ask a question not relating to the exhibit but relating to evidence that was given on the last day. I just wanted to ask you, Mr. Dixon, with reference to some answers you made to Mr. C.E. Smith on the last day of the Hearing, and I am referring to page 2208 of the transcript. The question was,

"Q. Tell me this, Mr. Dixon, isn't is possible for the F.P.C. to say to you people when you apply for a permit to send gas from the United States into British Columbia that there should be no delivery of gas to B.C. whenever there is not sufficient gas for consumption or storage for customers in the United States for commercial, industrial and so on?

A. I do not think they could possibly do that.

Q. Do you mean they would do it or could do it?

A. I do not think they could do it."

Now, I have here in Section 3 of the United States Natural

Gas Act which reads:

"After six months from the date on which this Act takes effect, no person shall export any natural gas from the United States to a foreign country or import any natural gas from a foreign country without first having secured an Order of the Commission authorizing it to do so. The Commission shall issue such Order upon application unless after opportunity for hearing it finds that the proposed exportation or importation will not be consistent with the public interest. The Commission may, by its Order, grant such application in whole or in part with such modification and upon such terms and conditions as the Commission may find necessary or appropriate, and may from time to time after opportunity for hearing and for good cause shown make such supplemental Order in the premises as it may find necessary or appropriate."

I was going to ask you whether you would care to alter the answer which you gave, Mr. Dixon?

A No, sir, not in any way at all.

Q You are aware, I take it, that the Federal Power Commission has in certain of its decisions stated it has no authority to vary contracts where it considers it necessary in order to carry out the provisions of the Natural Gas Act?

A And it has been overruled by the Supreme Court. Now, I am no lawyer, but from what I find -- maybe some of the learned lawyers from the States could answer this.

Q You are sticking to the position as stated to Mr. Smith?

A That they can not change it if they once grant it.

CROSS-EXAMINATION BY MR. McDONALD:

Q Just one question, Mr. Dixon, on Exhibit 74, the first page. Could you tell us the Btu. value of the gas in each of those fields, for instance, Britalta Deep Rock and the Many Islands field?

A I have not it handy.

Q You have not it handy?

A No. Nearly all of it, though, except in one field, which is the Devonian field, is fairly low, around 950, but the others are all very closely approximating slightly under 1,000. That is my memory.

Q Yes. And do you recollect, or could you tell us, the Btu. value of the gas in the Pincher Creek field ?

A I do not remember. I think that was a little higher, as I remember, but I am not certain.

Q Yes. Then on page 2 you show the end factor in Many Islands of .72. Were tests made of that gas -- that would be on page 2 -- tests were made and that was the end factor?

A Yes. Where it is 85 that is assumed, the others are due to tests.

Q The others are due to tests?

A Yes, sir.

Q And the 685 we have dealt with before?

A Yes.

Q Yes, thanks.

CROSS-EXAMINATION BY MR. STEER:

Q Mr. Dixon, on page 16 of your exhibit, I understand your suggestion to be that Canadian Western should build gathering lines in the Brooks area and have that gas delivered into your main pipeline to be carried to Granum, is that what the suggestion is?

A Well, it could be done in many ways, either the Alberta Natural Gas Grid could build the lines and take the gas and transport it or it could be taken from, for instance, the Cessford field and brought to a compressor station which then would be built near Brooks and transport it for the account of the Canadian Western, or possibly the Alberta Natural Gas Grid could buy the gas and sell it at a point near Granum. It could be done in many different ways, whichever was determined best by mutual negotiations or by Order of the Board.

Q It would not be your idea that any of your contract gas, if I may call it so, would be available for Canadian Western?

A Not excepting in an emergency.

Q On page 18 I would like to get from you your idea of what this plan is. I see that you summarize by saying that you are going to deliver 745 to 1229 billion cubic feet to the Alberta Natural Gas Grid Limited from Brooks. Now, is there any definite plan formulated in here whereby that gas is to be gathered and delivered?

A No. No definite plan, no, excepting the fields are available and the line would be there and it would be entirely premature to try to make a definite plan without contracts

and Orders of the Board.

Q So that you have mentioned three, I think, first the Alberta Natural Gas Grid would buy the gas, gather it through the Grid System and sell it to Canadian Western?

A That would be one method.

Q That is one. And the second one is that Canadian Western would gather its own gas and make such use of your facilities as it required in order to get the gas to the points of consumption?

A Yes, sir.

Q That is number two?

A Well, that was divided.

Q Pardon?

A That was divided into two ways, either they could gather it and the Grid would build the line to the field or Canadian Western would built the line to the field.

Q From where?

A From Brooks.

Q And then how is it collected from Brooks into the Canadian Western system?

A It would go into the downstream side of the compressor station there in Brooks and then go through the line.

Q Through the line?

A Yes, and come out at a point near Granum.

Q I see. And is your scheme engineered so as to accomodate this additional 1100 to 1300 billion feet required over the period by Canadian Western?

A Yes, sir. We have a 24-inch line and no compressors in it as originally designed.

Q The 24-inch line for your Grid?

A Yes, sir.

Q Running from --

A From Brooks to the compressor station at Pincher, the Pincher compressor station. That is greatly in excess of what we require. Now, that one compressor station at Brooks and using no more than the 750 pounds there we could deliver all of the gas that was needed at Pincher compressor station and drop off 120 to 130 million at the point where it crosses the Canadian Western line.

Q All you say about cost, is that this scheme would result in costs below Canadian Western building its own system?

A I think it would be substantially below because the incremental cost of putting more gas through a large line is a great deal less than building a line for that gas.

Q Would you have any idea of how much per thousand cubic feet gas gathered in any of the ways that you have outlined would be?

A Well, it would all depend on the amount of gas you were getting. If it was an amount of say 10 million a day, something of that order, or 20 million a day, this method would be a fraction, say, a fourth or fifth of the cost of bringing a direct line.

Q You know that Canadian Western pays 10¾ cents for gas at Turner Valley at the outlet of the scrubbing plant?

A Yes, I know that.

Q And would you give us a comparative figure as to the gas gathered in any of the ways that you have outlined here?

A It depends on what you paid for the gas.

Q Leave the field price out of it and tell us what the transportation cost would be?

A I think it would be on the order, from Brooks to where it crosses the line, on the order of 2½ cents, something like that.

Q Thank you.

CROSS-EXAMINATION BY MR. MAHAFFY:

Q Mr. Dixon, in connection with the estimated cost of the gathering system, am I right in assuming that you used the same unit prices as in Exhibit 65?

A Yes, sir.

Q The only difference is caused by the rearrangement of the system itself?

A That is correct.

Q For instance, on the price of pipe, $125.00 per ton, you had some discussion with one of the counsel a couple of weeks ago about that price?

A We are using the same price.

Q The same figure?

A Yes, sir.

Q Thank you.

EXAMINATION BY MR. C.E. SMITH:

Q I have a question, Mr. Dixon, if the rest are through for the moment. Referring to your Table "J", I think it is, at page 15 of Exhibit 74, that is the last page in Table "J". Have you that?

A Yes, sir.

Q Your total cost of 12 million there, the very last line?

A Yes.

Q Does that include what I understand was included before when similar figures were given? Does that include, oh, interest -- where are these various things you had before? Interest during construction, engineering supervision, overhead during construction, and preliminary expense - you remember those were separate items previously?

A Those would still be separate.

Q In Exhibit 15?

A I would like to see my old exhibit for just a moment.

Q What I wanted to get at, Mr. Dixon, if they are included in that 12 million and where, if not, should they be added?

A I would like to look at my old exhibit to see just how it was. I think they should be added but I am not certain.

MR. NOLAN: I wonder if I might ask Mr. Dixon to look at page 7 in Exhibit 66, Mr. Smith.

A That should be added to the grid in Exhibit 74. You see, we have joined, we have taken the entire cost of the system as the base construction cost and then added engineering, supervision, interest and such items to the whole and make a comparison. This should be compared to the 12,907 shown on page 7.

MR. NOLAN: 12 million?

A $12,907,000.00.

Q MR. C.E. SMITH: Shown on page 7. What is that exhibit?

MR. NOLAN: 66.

Q MR. C.E. SMITH: Does the same thing apply to your

addition? Does that apply to your Exhibit 73, Mr. Dixon?

A I think so.

Q And while page 7 gives us the figures, that should be added to the 12 million on Exhibit 74?

A On page 7. The old cost of the Exhibit 66 was $12,907,000. That compares to the $12,000,000.00 in Exhibit 74, you see, as we have cut out one line.

Q Well, what do we add for those three items to our Exhibit 74? Can you give it to me in figures or submit it later? You say that compares to the 12,907 to which you add engineering superivision at 4 per cent, organization and so on.

A We have never given that for anything but the over-all figures. In Exhibit 66 we have the base construction cost of $82,359,000.00.

Q Yes.

A To that we added engineering and supervision, organization, expenses, intangible plant, interest during construction, and that brought the gross plant to $19,500,000.00.

Q Well, it was with respect to gathering system, can you give the figure similar to what was given in Exhibit 15 where you have your gathering system set out and your total cost, then you add to that 5 per cent for interest during construction, 4 per cent for engineering, superivision and so on?

A Which exhibit was that, sir?

Q 15, Mr. Dixon, exhibit 15?

A I have not got that exhibit with me.

Q Well, probably I can show you what I am looking at and you will have a better idea of what I am trying to ask you. You see what I have in mind, Mr. Dixon?

A We would have to figure that out, because we have not done it, for the three separate companies. That would have to be worked out.

Q Would you use the same percentage?

A Yes, we would use the same percentage.

Q I see.

A We would use the same percentage as we have used in the schedule, I forget the number.

Q MR. NOLAN: 4.

A Schedule 4 of exhibit 66.

Q MR. C. E. SMITH: Yes?

A It would be the same percentagewise.

Q We would take those percentages under different headings and add them to your gathering total costs in this exhibit and they would correspond?

A That would correspond.

Q Would there be a similar addition to your exhibit 73?

A There would be, yes, sir.

Q I mean, that is how it would be figured out?

A Yes, that is how it would be figured out.

Q That is all, thanks. I wonder by any chance, I take it, Mr. Dixon is likely to be here for a few days anyway?

A Yes, sir.

MR. C. E. SMITH: I wondered if there would be an

opportunity to ask him any further questions, if we should so desire, Mr. Chairman? As a matter of fact, I came here this morning thinking that Western was going to proceed. You do not mind, I take it, Mr. Nolan?

MR. NOLAN: Oh, Mr. Dixon is going to be here for some time yet, I think.

MR. C. E. SMITH: I just make the request in case there is something further.

CROSS-EXAMINATION BY MR. STEER:

Q Mr. Chairman, I saw this exhibit for the first time this morning, and if there are any further questions after I finish, perhaps I will be permitted to ask them.

THE CHAIRMAN: Yes.

Q MR. STEER: Perhaps I will be permitted to ask you with regard to page 19, as I overlooked it, I do not know whether you highlighted that page or not, Mr. Dixon? I do not recall you doing so. That is your proposal for Northwestern Utilities Limited?

A Yes, sir.

Q As I understand it, the first proposal you make there is that there should be a trunk line connecting up Morinville, Picardville and Boyle-Mustang-Amisk Lake?

A This is not a proposal. It is a method that might be used, I think, for the time any such thing is needed, which is many years off, and there would be a great deal of difference in the way you would go about it, as there certainly will be something done between now and then.

Q What you are doing is suggesting that Northwestern build that

line and gather that gas, is that right, when the need arises and no other source is open?

A Yes, that would be correct.

Q And you are also suggesting that Northwestern should rely on DeGolyer and MacNaughton's report on the quantity of gas reserves?

A That is the last report - no, it is not. Pardon me. There has been a report since then which I think has increased that but that was a report which was as of the time of writing this, and this seemed to be the latest, and certainly the amount of gas, I think, is changing.

Q This gas, I take it, is dry, or do you know?

A Yes.

Q And then you say that Northwestern ought to consider the Cretaceous sands in the Acheson and Golden Spike area, and ought to consider what, I believe, is wet gas from Majeau Lake?

A Well, if that would be the last they had, that would be the most convenient gas, and that gas is, well, the gas even to the far north, up in the Peace River region, is just about the same distance as the gas in the Southern part of the Province from Edmonton, so that this project of bringing gas from the south does not interfere with or alter or change in any respect the prospects of getting gas for Edmonton.

Q And you are suggesting that the gas from Acheson and Golden Spike, it is the gas from the Cretaceous sands that should be obtained, and when will that be available, have you any idea, Mr. Dixon?

A Well, according to my ideas, it would be available much sooner than has been estimated by a great many of the others, and I think the indications are, from present, developments, and the increase in the gas/oil ratio, that there will be very large amounts of gas coming from all of the oil fields during the next four or five years, if they produce anything like the present amount, and it would be far in excess of what Edmonton will be able to take.

Q But you are not talking about the Cretaceous gas in those fields now, are you? You are talking about the gas that is going to be produced with the oil?

A Yes, I was speaking of that.

Q Yes?

A The Cretaceous gas would have to be taken after the other gas was pretty well exhausted, to make it economical.

Q You are not going to get any Cretaceous gas from those fields for a period of 20 years, are you?

A I think it will be before that.

Q How much before that?

A The other wells there will be at a very low point, and many of them abandoned, and then you could use them to perforate into the Cretaceous.

Q How long before the expiration of 20 years, would you say?

A 10 years.

Q I see. Majeau Lake, I think you say, is a wet gas?

A As I recall it . . .

Q Pardon me?

A As I recall it, this is from memory, I think it is, but my memory does not serve me there.

Q That is what you say:

"An important wet gas discovery was made earlier in the year at Majeau Lake, which could also be considered as a potential source of supply."

A Yes, that is wet gas.

Q Yes. That gas would have to be treated in an absorption plant before it would be suitable for Northwestern's purposes, would it?

A Yes, sir.

Q Is there enough gas there to justify the construction of an absorption plant?

A I do not think there is as yet, but it depends on the type of absorption plant. They have some that can be utilized, with a very small amount of gas, but it is not a very efficient operation.

Q And the economics of this proposed system connecting Boyle, Morinville and Picardville, and that area, has not been gone into?

A Well, let us say, no, the economics has not been gone strictly into.

Q You would not be able to tell us what you think Northwestern could gather of this gas, would you?

A No, I couldn't. That would be a long calculation.

Q Even assuming that we accept the figures for the reserves?

A No.

Q How far is it from Edmonton to Provost, have you any idea?

A From where?

Q How far is it from Edmonton to Provost? That is another suggestion that you make, a southeasterly expansion?

A Well . . .

Q Well, as I understand it, you suggest they build to Fabyan and then from Fabyan to Provost, and how far is it from Edmonton to Provost, 200 miles?

A Wait just a minute. 160 miles in a straight line, more or less.

Q Yes?

A And from the end of the line in the Viking-Kinsella field, if you take it in a straight line to Provost, it would be about 50 miles.

Q Where do we get your figures for the reserves in Castor and Provost, DeGolyer and MacNaughton?

A DeGolyer and MacNaughton, I think.

Q You do not say so here?

A I think that is it. I think that is right.

Q Yes?

A That was an omission.

Q That is all, thank you.

MR. STEER: I may have, after seeing the officials of the Gas Company, some further questions from Mr. Dixon, if I may, Mr. Chairman?

THE CHAIRMAN: Yes.

EXAMINATION BY DR. GOVIER:

Q Mr. Dixon, I wonder if you would tell us what the cross-reference is with respect to the figures presented on page 1 of your submission? Is that also DeGolyer and MacNaughton's latest study?

A No, there is nothing in DeGolyer and MacNaughton on that. They are all, as it states here, from the companies themselves. The Britalta-Deep Rock was testified to by

Mr. Slipper of the Britalta Company. The California Standard will be testified to . . .

Q I see.

A . . . and the Canadian Gulf, their figure is the figure given by Canadian Gulf.

Q On page 2, Mr. Dixon, you mention in the last sentence of the first paragraph:

> "In the succeeding years peak-day production was limited by a sand-face differential pressure of 75% of that under initial conditions."

I take it that is that is under the same basis or along the same lines as Dr. Brokaw indicated earlier, is that correct?

A Yes.

Q Would you tell me why, Mr. Dixon, Pincher Creek has been made an exception from that general programme and you have used 100% for Pincher Creek?

A That is because the Gulf believe that would be a proper way to work it. This is on account of the fact that when we get down towards the end we still have a very large plant there, a very great investment, and it would be well worth while to keep that plant going at capacity as long as possible, and it still has a very considerable differential at the sand face there of 330 pounds.

Q I take it that after consultation with Gulf, you are satisfied that it would be good engineering practice to operate at 100% of the initial differential?

A That is what they believe.

Q When does that start, Mr. Dixon? Is it page 12 that we refer to, Mr. Dixon?

A Page 11. No.

Q MR. NOLAN: Page 12.

A Page 12.

Q DR. GOVIER: I guess it starts on the 11th year, is that right?

A Yes, it starts at the 11th year, and then the limiting factors are 330 pounds differential.

Q So that for the first 10 years the limiting factor is 25% of the potential figure shown in column 3, and for the remaining 10 years it is the 330 pound differential?

A Well, it comes to 330. It would not be a 330 pound differential on the 11th year, because it is slightly under 25% there.

Q Yes, but the limiting factor?

A Yes, the limiting factor would be 330 pounds in the 20th year.

Q Mr. Dixon, could you tell us whether previously you did give us information concerning back-pressure tests, for example, in the Many Island Lake field? I am looking at page 6.

A That was testified to by Mr. Slipper, yes, sir. He gave all that information.

Q That pressure data was given?

A Yes.

Q And the potential per well which appears in column 3, that is based on the results of those tests?

A Yes.

Q Is that correct?

A Yes.

Q How about the number of wells, Mr. Dixon? Would you tell

us how you arrived at those figures?

A In each case - well, in all the cases it is to drill enough wells to keep up the deliverability.

Q And what spacing was taken into account?

A 640 acres to a well.

Q So then in all cases the number of wells does not exceed the number that you would obtain on 640-acre spacing?

A That is correct.

Q Have you consulted with the companies in all cases to determine whether in their opinion it would be economical to drill this number of wells, and whether they would be prepared to do so?

A They have all stated they are prepared to do so, the geologists have, or the officials.

Q That is in every case, Mr. Dixon?

A Except the Standard Company, and they will go on the stand to testify to that.

Q Would you look at page 17, Mr. Dixon?

A Yes, sir.

Q I notice in Table 1 that you are suggesting that certain reserves which lie a certain distance from Brooks might be made available to a compressor station located near Brooks, and I have done a little arithmetic here, Mr. Dixon, and I notice that in general the number of billion cubic feet that could be picked up by reaching out one mile is of the order of 4 or 5 or less. In your opinion, is it economic to reach out, say, 10 miles to get 40 or 50 billion cubic feet of gas reserve?

A Why, not if you can get it somewheres more conveniently.

You see, that is the distance from Brooks, but if you are building a line to, for instance, Cessford, then it is only, where there is a very large reserve, then you have the distance from Cessford to Sunnynook, which would be the determining distance which you would have to use.

Q That is one of the things I was wondering about, what the line was from?

A Wait a minute now.

Q Cessford is not in the original scheme, is it?

A No, sir.

Q Well, now, let us just assume, Mr. Dixon, that you want to tie in Sunnynook, I take it then you would not do that unless you were willing, or unless you were also tying in Cessford, is that right?

A That is correct, yes, sir.

Q Now, if you are tying in both of them, you would be tying in the reserve which, referring to your Table 1, would be somewhere between 4 and 5 hundred billion cubic feet?

A Yes.

Q On that order of magnitude?

A Yes.

Q And that would be tied in with somewhere between 40 and 50 miles of pipe?

A That is correct.

Q In other words, you get between 4 and 5 -- no, in that distance you would get about 10 billion cubic feet per well, I am sorry, 10 billion cubic feet per mile?

A Yes.

Q Is that, generally speaking, an economic proposition?

A Oh, yes, that would be certainly an economic proposition.

Q Now, let us look at Rainy Hills?

A Yes, sir.

Q I notice there you have about 25 miles for 90 billion proven and probable.

A Well, we should take in Stevesville, Rolling Hills and Rainy Hills. They have that 25 miles, they are within that 25 miles, more or less.

Q You group them altogether?

A Yes, sir. It is a very considerable reserve, which would make it economical.

(Go to page 2319)

Q So that generally speaking I take it, Mr. Dixon, you believe that if those reserves are properly proven that they can be economically made available to Princess?

A Certainly. Yes, easily.

Q What about Table 2, this possible extension to the Pakowki Lake area? This is a matter, according to your estimate, of 356 billion cubic feet. Could you indicate how many miles of pipe would be required in picking up that reserve?

A I will assume that the line from Foremost is too small. I think that is a 6-inch line. It was only a small amount of gas. There would be only, I think, about 10 miles of line to get to that field from Foremost but I believe you would have to built a line from Bow Island to Pendant de'Oreille, which would make a distance of something on the order of 45 miles.

Q How would you get it from Bow Island to the market?

A Through their presently existing line.

Q Would it have the capacity to handle it, Mr. Dixon?

A It is a 16-inch line which I believe can work at about around 400 pounds pressure. It is an old line.

Q MR. STEER: I doubt that, Mr. Dixon. The line is 40-odd years old.

A THE WITNESS: I believe it has been well kept up.

Q Subject to correction, I think it is about 250 pounds.

A That would depend, as they say, just on the condition of that line.

Q DR. GOVIER: You see what I am getting at, Mr. Dixon. I was just wondering if that Pakowki area

gas has to be piped all the way to Calgary in a new system.. The economics would be one thing, I take it, whereas if it can be injected into a present system the economics would be different?

A Assuming it was brought -- it could be brought directly north to the 16-inch line of the projected Alberta Natural Gas Grid, and that could take a very large quantity of gas.

Q North to a point near Suffield, do you mean?

A Up towards Suffield or Redcliff. If it was a larger volume of gas and they could not get it all through the other line it could certainly be brought up there with a line about 45 miles long.

Q The only other question I had, Mr. Dixon, is on page 21 in connection with the proposed extension of the N.U.L. system to Provost, and again I was concerned about the same thing, that is, whether one could consider it economic to extend between 50 and 100 miles for some 250 billion cubic feet of gas.

A That is not economic, no, sir, unless you have to have it. It would, of course, be economic if you must have that gas. Our expectations are that there would never be any chance of having to go to Provost.

Q Well, Mr. Dixon, I think that raises a point of whether the Board should consider gas that is not economical in trying to arrive at this surplus gas of the Province, gas required to reach Provincial requirements.

A That brings up a question which I am glad I have to answer. Taking gas from the southern part of the Province has no effect one way or another, for good or evil, on the gas

A. Faison Dixon,
Exam. by Dr. Govier.

available to Edmonton. If they need to go a great distance for gas, which none of us think will happen, and go to the southern part of the Province, that gas is just as far as going up towards the Peace River and getting the gas, wherefor the construction of this grid line does not affect in the slightest in any way the gas to Edmonton, so we are asked to furnish a method by which gas could be brought to Edmonton, but assuming no further discoveries this is a method to bring gas to Edmonton for the next 30 years from known reserves, not taking in the gas that is further north or the gas equally distant further south.

Q Could it be put this way, Mr. Dixon. While you would not particularly commend this on economic grounds, it is the only thing you can say at present in the way of bringing established gas that could be used to meet N.U.L.'s requirements?

A That is correct. There is another way that you could do it that might be more economical than any of these, and that is building a line going north, a big line, if there should be enough gas proven up there.

Q I take it you do not think there would be any merit in joining the reserves between the northern and southern parts of the Province?

A Not for the moment. Like I testified before, I think there should be a line when there is enough gas so that it would not be too costly for all concerned to connect the north and south of the Province, preferably this to be designed after the Foothills section has been thoroughly explored, where the chances are for the large quantities

of gas, and in the future when more gas is needed for export then to extend the lines further north and join the whole thing into a complete unitized system. I think that would be of great advantage, but we are talking now just of 80 billion export and it certainly could not be joined with that amount of gas and have a gas at a price at which it could be exported in the volumes that we are contemplating.

Q There is one other thing, Mr. Dixon, your reference on page 24 to the local market in the Province. Are we to interpret this tabulation on the bottom on the page as meaning that you believe those towns, that is, the five towns listed, could reasonably be served from your line but you do not believe many other communities could be served reasonably?

A That is correct. Very small communities are very difficult to serve unless it is done by the local people who are doing it in a local way.

Q There are no very small communitieswithin a mile or so of you, is that correct?

A No. That is a rather desolate country.

Q Thanks, Mr. Dixon.

CROSS-EXAMINATION BY MR. D.P. McDONALD:

Q Just one thing, Mr. Chairman, dealing with the economics. Mr. Dixon, as I recollect your statement, you referred to the fact that you could pick up gas in the Peace River country possibly of the same volume at the same cost as the south country for the Edmonton district?

A Yes.

Q You were discussing that generally. Have you given any thought to the cost of building a line from the Edmonton district to the Peace River country?

A I think it would be somewhat more, say, than the Britalta holdings from Edmonton.

Q The only thing we have on that in this Hearing so far is the evidence of Trans-Canada Pipelines Limited. They gather all of their gas in the south country for 27½ million dollars. The other estimated costs of their system from Jarvie to the Peace River country is something in the neighbourhood of 17 million dollars.

A I believe Westcoast gave very lengthy testimony on the subject of what it costs to gather gas from various distances and various volumes.

Q Yes. The extension to the Whitelaw-Tangent area, 232 miles of pipeline, to handle 150 million cubic feet per day is $17,907,500.00, according to the Trans-Canada Pipeline exhibit.

A That is different from what your own experts testified about it.

Q Yes, that is true.

A And that would be about the same distance as coming down to the Medicine Hat region.

Q Now, the other thought I had, Mr. Dixon, as I understand it, your deliverability schedule in Exhibit 74 shows 28 wells, 26 wells, to be drilled in Pincher Creek. That would be on page 12 of the exhibit.

A I believe so.

Q Well, the acreage, I believe, given for that field is 17,250 acres. Divide that by 640 acres and you come up with 28 wells. Did you give any consideration to the spacing of the wells?

A That is a matter Gulf has been studying very carefully.

Q Yes. Thanks.

MR. C.E. SMITH: Are the two contracts going to be submitted, Mr. Nolan, or not?

MR. NOLAN: Yes, we have those. I was going to put them in now, if I may. Those were contracts, you remember, sir, with the California Standard Company and the Britalta Petroleums and Deep Rock. There has been distribution made of them, as you know, but they have not been formally marked and put on the record, so I am going to ask, Mr. Chairman, if the Britalta Petroleums Limited and Deep Rock Oil Corporation could be given number 75, and the California Standard Company be given number 76.

AGREEMENT NORTHWEST NATURAL GAS COMPANY AND BRITALTA PETROLEUMS LIMITED AND DEEP ROCK OIL CORPORATION PUT IN AND MARKED EXHIBIT No. 75.

AGREEMENT NORTHWEST NATURAL GAS COMPANY AND THE CALIFORNIA STANDARD COMPANY PUT IN AND MARKED EXHIBIT 76.

MR. NOLAN: Is that all for Mr. Dixon? He may be excused now?

THE CHAIRMAN: Unless someone wants to question him on these contracts now. Does anyone wish to question Mr. Dixon with regard to either of these two contracts, California Standard Company and the Britalta? That will be all, then.

MR. NOLAN: Mr. Chairman, with respect to the submission of The California Standard Company that I referred to a few moments ago, I am advised by Mr. Dunkley, who is the engineer employed by that company and who will give evidence when he is asked to give it, that there is an additional map to be placed in that exhibit, and I thought as study was being given to it, both by the Board's engineers and by other applicants, it might be convenient now if that map were distributed so that it could be placed in the exhibit and an opportunity given to look at it before Mr. Dunkley was called to give evidence, whenever that would be.

THE CHAIRMAN: I wonder if you have any objection to Mr. Dunkley going in now, perhaps?

MR. NOLAN: I should have explained that Mr. McLaws, who is ordinarily present to represent this company, is not in Calgary today, and that is the reason I am doing this for him.

D. S. DUNKLEY, having been first duly sworn, examined by Mr. Nolan, testified as follows:

Q Mr. Dunkley, you have been sworn?

A Yes, sir.

Q What is your position with the California Standard Company?

A I am presently a staff engineer with the California Standard Company.

Q Staff engineer?

A Yes.

Q And what are your academic and professional qualifications?

A I graduated in mining engineering from the University of Alberta in 1942. I worked for the United States Government on the Alaska Highway for a few months, worked for the Department of Transport on the Calgary Airport for about six months, and then joined the staff of the Petroleum and Natural Gas Conservation Board as a field engineer in Turner Valley. I joined the California Standard Company in the early part of 1945 and worked in the Conrad, Taber and Princess fields, and was transferred to Calgary about the latter part of 1948 and have been working on various engineering problems and doing engineering work.

Q You have described yourself, Mr. Dunkley, as a staff engineer?

A Yes, sir.

Q What are the duties of a staff engineer insofar as the California Standard Company are concerned?

A They are more or less in general to advise management on technical aspects of certain phases of operation, such as producing, reserves, valuations of property.

Q Now, Mr. Dunkley, I have before me what is entitled, "Submission to The Alberta Petroleum and Natural Gas Conservation Board Regarding Gas Reserves of the Princess, Patricia and Dunmore Areas," dated the 3rd of December, 1951, and prepared by The California Standard Company. Was that document prepared by you or under your supervision?

A Yes, sir.

Q I am going to ask, Mr. Chairman, that that be given number 77, please.

D. S. Dunkley,
Dir. Ex. by Mr. Nolan.

SUBMISSION OF THE CALIFORNIA STANDARD COMPANY REGARDING GAS RESERVES OF THE PRINCESS, PATRICIA AND DUNMORE AREAS PUT IN AND MARKED EXHIBIT 77.

MR. NOLAN: Now, the narrative is very short in this exhibit, Mr. Chairman, and I think it would be quicker to read it than attempt to summarize it.

Q Would you please read to the Board, Mr. Dunkley, the two pages of narrative in Exhibit 77.

A SUBMISSION TO
THE ALBERTA PETROLEUM AND NATURAL GAS CONSERVATION BOARD REGARDING GAS RESERVES OF THE PRINCESS, PATRICIA AND DUNMORE AREAS.

Studies made by our engineering staff indicate that the proven and probable marketable reserves of the Princess, Patricia and Dunmore areas total 356,100 MMcf of which the California Standard Company has an estimated 68.5%. Proven reserves amount to 203,600 MMcf and probable reserves to 152,500 MMcf of which California Standard have respectively 80.2% and 52.7%.

The appended tables show the distribution of the reserves by productive zones and the accompanying maps outline the extent of the reserves. Boundaries of the proven reserves are shown in solid lines and of the probable reserves in dashed lines. All the reserves were calculated on a volumetric bases to a base pressure of 15.025 psia and pertinent data used in the calculations appear in the appendix.

In calculating the reserves volumetrically, a few comments on the factors involved appear to be in order.

Areal Extent was arrived at by reference to

geological and geophysical structure maps and well data. From sample and core descriptions, electrologs and formation tests, gas/oil or gas/water interfaces and pinchout boundaries were established. The accuracy of these boundaries varies directly with the available factual data.

Gross thickness and effective thickness of the gas bearing zone was obtained from electrologs, sample and core descriptions and formation tests. Isopachous maps of the total thickness above the oil or water lines were constructed, planimetered and the number of acre-feet of sand was calculated. An "effective thickness factor" varying between 50 and 75% was then applied to obtain "effective acre feet".

Porosity was obtained from core analyses, averaged and applied to the entire area. The distribution and frequency of these analyses leaves much to be desired in some cases.

Connate water values were derived from restored state analyses of several core samples submitted to a service company. In each case the "breakover" point was plotted against permeability on semi-logarithmic paper and the best fitting straight line was drawn. The connate water saturation value corresponding to the average permeability was then applied to the entire area.

Composition of the gas was averaged from analyses of samples taken during formation tests.

Formation Pressures: Bottom hole pressures, not actually measured, were estimated by means of a pressure gradient factor, determined in many instances from

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Dir. Ex. by Mr. Nolan.

build up pressures obtained on formation tests. In the Dunmore and general Princess area, pressure gradients appear to be slightly in excess of 0.465 lbs/sq. in. per foot of depth for all formations above the Devonian. A measured pressure is available for the Devonian at Princess.

Formation Temperatures unless actually measured, were calculated using the formula:

Temperature = $40^{\circ}F + 0.0017 \times$ depth

This was found to check with measured temperature fairly closely.

Commitments to Northwest Natural Gas Company

The California Standard Company has entered into contract with Northwest Natural Gas Co., contingent upon their obtaining an export permit, to deliver gas to Northwest as follows:

First year - 7½% of Northwest's requirements
Second year - 9½% of Northwest's requirements
Third year - 15% of Northwest's requirements
Fourth year - through to the Twenty-fifty year - an average of 25,000 MMcf per day.

During the first year, the bulk of the gas committed would be supplied from the Sunburst and Basal Colorado zones. This would require eight wells from the Basal Colorado and seven wells from the Sunburst. There are at present enough suspended gas wells in the Princess area to meet this requirement.

The second year's requirements would be met from the Princess-Patricia area and would entail the drilling

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Dir. Ex. by Mr. Nolan.

of an additional Sunburst well, which would be dually completed for Sunburst and Basal Colorado production. Two Devonian wells would have to be drilled and two now-suspended wells reworked. Six Basal Colorado wells would be drilled partially as exploratory step-out wells for shallower and deeper zones. Toward the end of the year two now-suspended gas wells at Dunmore would be readied for production for the third year.

The third year's requirements would be met by the drilling of an additional Sunburst wells and two Devonian wells and the two wells at Dunmore mentioned above would be dual zone producers.

Subsequent drilling could easily follow the pattern as outlined in Northwest's deliverability schedule. Based on the present picture of the reserves and deliverability it is expected that California Standard would drill or rework a total of some 45 wells of which about 22 would be dual zone producers.

The actual timing and rate at which this drilling would be done would depend on various factors, one of which would be the decline in open flow potentials.

Respectfully submitted,

THE CALIFORNIA STANDARD COMPANY.

Q MR. NOLAN: Now, Mr. Dunkley, from my examination of this Exhibit 77 I take it that Tables 1, 2 and 3 show the distribution of the reserves by productive zones?

A Yes, sir.

Q That is Tables 1, 2 and 3. And the map which follows

those tables outlines the extent of the reserves?

A Yes, sir.

Q And then, finally, in this submission there is an appendix which shows the factors that were used by you in calculating these reserves?

A Yes, sir.

Q And is there anything else that you would like to say about this exhibit, or do you think that it is self-explanatory in view of what you have already said?

A I think it is self-explanatory, sir.

Q Well, then, just answer my learned friends, please.

THE CHAIRMAN: Does anyone wish to question Mr. Dunkley?

MR. C.E. SMITH: It is understood, is it, that Mr. Dunkley will be available at a later date or some time?

THE CHAIRMAN: I was hoping we could finish up with him today. You are not prepared to cross-examine, Mr. Smith?

MR. C.E. SMITH: This thing only arrived on Saturday, sir, some time, and I would much prefer it if he may be made available some time later.

MR. NOLAN: As I understand it, Mr. Chairman, Mr. Dunkley is in Calgary and expects to be here for the remainder of this week. Are you?

THE WITNESS: Yes, sir.

THE CHAIRMAN: Perhaps he could be excused now and return to his office and we could send word to him if he has to give evidence at some other time.

THE CHAIRMAN: All right, Mr. Nolan. I think we might adjourn.

(The Hearing then took a short adjournment.)

MR.HARRISON: Mr. Chairman, I have a very short submission to offer on behalf of the British American Oil Company, and unless I am subjected to some legal heckling, it should not take more than three or four minutes.

THE CHAIRMAN: Yes.

.....

R. H. C. HARRISON, having been first duly sworn, testified as follows:-

This is headed "In the Matter of the Gas Resources Preservation Act", being Chapter 2 of the Statutes of Alberta, 1949 (2nd Session) and amendments thereto.

THE CHAIRMAN: That will be marked as Exhibit 78.

SUBMISSION ON BEHALF OF THE BRITISH AMERICAN OIL COMPANY LIMITED MARKED EXHIBIT 78.

A And In the Matter of the submission of the British American Oil Company Limited.

The British American Oil Company Limited jointly associated with other Companies is interested in reservations, a gas licence and leases in the Province of Alberta, and reservations in the Province of British Columbia as shown on the attached Maps and legends thereon, the said Maps being Appendices "A" and "B" to this submission.

This Company, therefore, is interested in an export market for the natural gas which has already been discovered on one of the said reservations

R. H.C. Harrison,
Dir.Ex.

and leases, and the gas which may be discovered in the relevant areas.

This Company is in a position to negotiate for the sales of its share of such gas as may have been found, or may be found, with any Applicant in this Hearing who may be legally authorized to purchase, gather or export such natural gas, subject, however, to the following conditions and reservations:

1. The Company shall be satisfied as to the purchasers' integrity and financial responsibility as well as to his authorization by all Government bodies having or claiming jurisdiction in the matter to purchase, gather, and export such gas.

2. The Company reserves the right to process, or cause to be processed all or any part of the natural gas produced from its operations for the extraction of liquefied hydrocarbons, minerals, or chemicals recoverable therefrom, and also reserves the right to use such quantities of the gas as in its sole discretion may be necessary for the operation of such a plant for fuel, for further development and operation of its lands and leases, and for such re-cycling and repressuring operations as it may see fit to undertake, as well as for delivery to lessors under the respective leases as required by the terms thereof.

3. A written agreement satisfactory to the Company shall be entered into which shall include prices to be paid for such gas, quantities to be taken,

and which shall be acceptable to the duly constituted provincial authorities if it is necessary or desirable to have such approval.

This Company therefore submits these facts to this Board for its consideration in making disposition of the Submissions made by the several Applicants being heard at this Hearing.

DATED this 30th day of November, 1951.

THE BRITISH AMERICAN OIL COMPANY LIMITED.

and it is signed by me as Western counsel.

THE CHAIRMAN: Does anybody wish to question Mr. Harrison?

A I might say that the leases shown on Map "A" in the hatched area constitutes some 11,000, that is the freehold leases, some 11,000 acres.

THE CHAIRMAN: Are there any questions?

.....

CROSS-EXAMINATION BY MR. NOLAN:

Q I was going to ask, Mr. Harrison, did I understand you to say that your company was willing to make contracts for the sale of gas?

A That is the position.

Q No contracts have, in fact, been made?

A Not to my knowledge.

Q MR.STEER: How much gas have they got for sale?

A I have not the remotest idea.

THE CHAIRMAN: All right, thanks, Mr.Harrison.

MR.HARRISON: Thank you, Mr. Chairman.

MR. C. E. SMITH: Will you make the same statement on behalf of the W. C. P.A.?

MR.HARRISON: I want it clearly understood that I am appearing here as an employee of the British American Oil Company.

MR.MACLEOD: Mr. Chairman, in making a further presentation with regard to the application of the McColl-Frontenac Oil Company Limited and Union Oil Company of California, we have undertaken to answer four questions with regard to which the Board asked for further information. We have prepared one brief only, and we will have this brief dealt with by three different witnesses. I will call first Mr. L. S. Stadler.

THE CHAIRMAN: That will be marked as Exhibit 79.

SUPPLEMENTARY BRIEF ON BEHALF OF McCOLL-FRONTENAC AND UNION OIL COMPANY MARKED EXHIBIT 79.

.....

LOUIS S. STADLER, having been first duly sworn, examined by Mr. Macleod, testified as follows:-

Q Mr.Stadler, you are an employee of the Montana Power Company?

A Yes, sir.

Q Will you please tell the Board what your capacity is with that company?

A I am the manager of the gas department of the Montana Power Company, a position I have held since April of 1949, and I have been an employee of the Power Company in the gas department since 1931.

Q You are familiar with the present operations in the Pakowki

Lake area?

A Yes.

Q Are you in charge of them?

A Yes, that is my function.

Q Now, with regard to Exhibit 79, Mr. Stadler, I would like you to deal first with that part of the brief which is designated (a) beginning on page 1?

A Yes.

Q Will you read it?

A Yes.

(a) APPLICANTS' OWNERSHIP OF GAS AND APPLICANTS' CONTRACTS TO PURCHASE OR OTHERWISE ACQUIRE PROPERTY IN GAS WITHIN THE PROVINCE.

The Applicant, McColl-Frontenac Oil Company, Limited, was the holder of petroleum and natural gas rights under leases from the Crown in approximately 9,846 acres and under an agreement with Hudson's Bay Company and Imperial Oil Limited of approximately 640 acres all in the Black Butte natural gas field. The Applicants were the joint holders under leases from the Crown of petroleum and natural gas rights in approximately 19,793 acres in the Black Butte field; approximately 13,754 acres in the Smith Coulee field; approximately 65,903 acres in the Pendant d'Oreille field, and approximately 35,976 acres in the Manyberries field. Particulars of these holdings are set out as Exhibits "A" and "B" to an agreement dated 14th June, 1950, between the Applicants as Sellers, and The Montana Power Company as Buyer, filed with your Board as Exhibit 8 at the hearing of December 4th, 1950. Since the agreement was executed certain changes

have been made in the said acreages, owing to certain leases having been surrendered and certain additional rights acquired.

Q Just a minute there, Mr. Stadler. When this brief was prepared, the lands were identified by reference to Exhibit 8. Since that time it has developed that the changes have been rather more extensive than was anticipated when this was prepared, and I have a statement showing the present holdings for the information of the Board. Perhaps we could put that in as an exhibit?

THE CHAIRMAN: That will be Exhibit 80.

DOCUMENT SHOWING CHANGES MADE IN ACREAGE MARKED EXHIBIT 80.

Q MR. MACLEOD: Would you read that statement, Mr. Stadler, please?

A Do you want that read?

Q Yes, please.

A

CHANGES MADE IN THE ACREAGE AFFECTED BY THIS APPLICATION SINCE THE EXECUTION OF THE AGREEMENT OF 14TH JUNE 1950

Leases Surrendered or Assigned:

Black Butte Field	21,773 acres
Pendant d'Oreille Field	1,921 acres
Manyberries Field	12,349 acres

leaving the acreage of petroleum and natural gas leases affected by this application in the several fields as follows:

Black Butte	8,506 acres
Pendant d'Oreille	63,982 acres
Smith Coulee	13,754 acres
Manyberries	23,627 acres (a)

The Note (a) applies to the Manyberries field, which is under licence No. 4.

Crown P. & N.G. Reservations Acquired:

No. 1238, containing 87,561 acres, Township 7, Ranges 5, 6 and 7, and Township 8, Ranges 5 and 6, all West of the 4th Meridian;

No. 1239, containing 93,760 acres in Townships 4, 5 and 6, Ranges 4 and 5, West of the 4th Meridian;

No. 1247, containing 36,160 acres in Township 1, Ranges 6 and 7.

There has also been acquired Gas Licence No. 4, covering 63,040 acres in the Bow Island sands of the Manyberries field. This acreage includes the 23,627 acres held under P. & N.G. Leases in the Manyberries field.

MR. C.E. SMITH: I wonder if we might have a copy of whatever that is that is being read?

MR. MACLEOD: Yes.

MR.MILVAIN: I will distribute them for you, Mr. Macleod.

MR. MACLEOD: Thank you.

Q All right, Mr.Stadler, will you continue, please?

A By the last mentioned agreement the Applicants agreed to sell and The Montana Power Company agreed to buy, subject to certain contingencies set out in the said agreement, including the granting of this application, all the said petroleum and natural gas rights together with certain surface rights, rights of entry and chattel property held in connection with such petroleum and natural gas rights, and to convey the same to The Montana Power Company or its subsidiary companies nominated by it to receive such conveyances. The Montana Power Company has procured to be incorporated Canadian-Montana Gas Company, Limited, an Alberta company to acquire and operate the said petroleum and natural gas rights, with the appurtenant rights and property including the construction and operation of gathering lines and Canadian-Montana Pipe Line Company, incorporated by special Act of the Parliament of Canada to acquire from the Applicants any permit to export granted pursuant to this application, to acquire natural gas produced by Canadian-Montana Gas Company, Limited, and to construct and operate a pipe line to export the same. The permit granted to the Applicants pursuant to Chapter 36 of the Statutes of Alberta, 1951, has been assigned with the consent of the Minister to Canadian-Montana Pipe Line Company, which is constructing a transmission pipe line from Section 8, Township 3, Range 8, West of the Fourth Meridian to a point on the International Boundary in Section 4, Township 1, Range 10, West of the Fourth Meridian. The price proposed to be paid by Canadian-Montana Pipe Line Company to Canadian-Montana Gas Company, Limited, the producer, is intended to cover the production

and gathering costs of the latter company.

(b) MARKETING AREA TO BE SERVED OUTSIDE ALBERTA SHOWING THE BREAKDOWN OF ANNUAL AND PEAK DAY EXPORT REQUIREMENTS.

The following map shows The Montana Power Company's present natural gas system and the proposed line to bring gas into that system from the fields in the Pakowki Lake area in southern Alberta. The company distributes natural gas to residential, commercial and industrial customers in the area shown.

The following table entitled "Market Requirements of Present Montana Power Company System" shows the annual and peak day requirements of the company's system by load classifications. The next table entitled "Estimated Market Requirements and Supply, The Montana Power Company" shows the amount of its estimated requirements which the company will be able to supply from its present Montana gas reserves and the amount which it proposes to supply from the Alberta reserves on an annual and peak day basis. The company will continue to withdraw gas from the Pakowki Lake fields after 1970, if any then remains, but the amount will not be sufficient to meet the company's estimated requirements unless additional gas supply is secured in that area.

The following tables show only The Montana Power Company's present market requirements plus an estimated normal increase through the years of residential, commercial and small industrial customers. They

do not include any increase in use by present large industrial customers, any new large industrial customers, or any service to communities not now served.

The reason for not extending the scope of the tables is that they show a need for all of the proven reserves which the company now has. However, the Montana Power Company does contemplate that present large industrials will gradually increase their use, that additional industries will be served as they develop, and that the company will extend its gas system to Missoula and Hamilton in Western Montana and to smaller communities in the area served by its gas transmission lines.

Therefore, the Montana Power Company is in a position to use beneficially an appreciable amount of gas over and above what is covered by the present submission, as and when such gas becomes available.

The third table following, entitled "Manner in Which Present and Future Requirements for Natural Gas in Export Market of Applicant May be Met From Existing Reserves" shows the proposed withdrawals on an annual and peak day basis from each of the four fields in the Pakowki Lake area.

Q Would you look at thos Tables, Mr.Stadler? You have already referred to the one on page 6. What is that?

A That shows the annual and peak day requirements by classifications for the present Montana Power Company system.

Q And your classifications are in the nature of the use?

A By use, yes.

Q Then your next Table is on page 6?

A Page 7, you mean?

Q Page 7, yes?

A That is a breakdown of the annual and peak day by sources of supply, indicating the United States and Canadian source.

Q The first row of double figures with respect to the annual and peak day are the same?

A They refer back to the market figure on the preceding page.

Q Page 6?

A Yes, that is right.

Q The only difference between these Tables is the breakdown?

A Yes, breakdown and source of supply.

Q 6 shows the breakdown as to use, and 7 is the source?

A Yes, that is right.

Q Is there anything you would like to say on those Tables?

A Well, there is only one other addition, and that is on page 8, and Mr. Dodge is going to cover that.

Q Is there anything you would like to say on these Tables 6 and 7?

A I think they are perfectly clear. I do not believe there is anything that I could add.

Q Table 7, what is the last item on that?

A Table 7 would show a peak day, a deficiency in peak day of 57 million, which would have to be got from some other source or from storage.

Q That is all for this witness.

THE CHAIRMAN: Does anybody wish to question this

witness?

.....

CROSS-EXAMINATION BY MR. MILVAIN:

Q Mr. Stadler, there are a few questions I would like to ask you. As I understand, you are in charge of the operations that are now going on in the Pakowki Lake area?

A Yes, sir, that is right.

Q Will you tell us what the present state of construction of the gathering and tap line system there now is?

A The gathering and transmission pipe is all in the ground. The river crossing across the Milk River was being lowered in, I think, Friday. That is the last report I have. The well stations in the Pendant d'Oreille and Smith Coulee fields, I am not sure of the stage of construction, the number of them, the number that have been completed and are being connected now. The Black Butte wells will be connected, I think, within the next ten days. The camp site is approximately 85% complete.

Q So that I take it then, that your gathering and tap line system is not yet completed?

A It is essentially complete. We hope it will be within the next ten days, ten or fifteen days.

Q Now, has anything been done in connection with the transmission line to Butte, or Cut Bank, rather?

A The Cut Bank line is all in the ground. They started running the pig from Cut Bank north on Saturday. The first main line valve was cut in Saturday. That system should be tested to 500 pounds within six or seven days, and ready for operation.

Q MR. MACLEOD: Cut Bank to the border?

A Cut Bank to the boundary.

Q MR.MILVAIN: You said that will be completed within six or seven days?

A Yes, that will be completed within six or seven days, I would imagine, at least by the middle of next week, unless there is some unusual occurrence.

Q Does that mean to say, Mr. Stadler, that in the course of a few weeks you will be in a position where the gathering system is complete, and also the transmission system?

A I think that is correct, yes.

Q I see. Now, insofar as the requirements shown in the Tables in Exhibit 79, which has just been filed, Mr. Stadler?

A Yes.

Q When was it that that information was compiled?

A Which Table are you referring to?

Q I am speaking of the Tables that you referred to here. On page 6 there is a Table which deals with the market requirements of the present Montana Power Company system, and on page 7 there is the estimated market requirements and supply of the Montana Power Company?

A I think the Table on markets has been compiled over the past several months, or even a longer period than that. The Table on page 7 has been revised within the past two or three months.

Q That is, Table 7 was revised within the last few months?

A Yes, that is the allocation.

Q I see. So that the information from which these Tables was compiled would be information that was in the possession of your Company about two or three months ago?

A I think, essentially, the information on which the Tables were based might precede that by a month or two. I believe it was in late summer.

Q Late summer?

A Yes.

Q That would be about right?

A Something on that order, yes.

Q So that all of the information required in order to set out the tabulations in these Tables was available to your Company, we will say, about the end of July? In other words, this information is not later than that?

A I think, essentially, that is correct, yes.

Q I see. Now, you, I suppose, are familiar with this map that appears on page 5 of the submission too, are you?

A Yes, sir.

Q And that shows the present complete system of the Montana Power Company?

A That is correct.

Q And that dotted part at the top is just what is proposed to be put in in the light of this application now?

A Yes, sir.

Q If you were to succeed?

A Yes.

Q So that as we look at this map on page 5, the heavy black lines indicate the existing Montana Power System? There is nothing projected in that?

A No.

Q Is there any enlargement of the scheme proposed?

A Enlargement of the scheme?

Q As shown on map 5, the map on page 5?

A No major extension from that, no.

Q Whether the permit now being applied for be granted or not?

A Now, if we applying for the, or if we are talking about the permit we are applying for here in the name of McColl and Union, it would probably contemplate extension to Missoula, which we have discussed in the text here.

Q I am just wondering, Mr.Stadler, we see here, on this map, page 5, what is the existing Montana Power system?

A That is correct.

Q I am wondering now, assuming that the permit now being applied for be granted, let us assume that, what extension would you then plan to the system as shown on that map?

A We would probably contemplate the extension to Missoula and a tap south to Hamilton, Montana. Hamilton is not shown here, it is south of Missoula.

Q You say you would probably contemplate that?

A I think that depends on some future development.

Q Does the granting of a permit by this Board determine whether or not that extension will take place?

A Of a general permit, it would, yes, sir.

Q I see. Now, I was just looking at your text here, Mr. Stadler, and I am looking at page 3 of the text, and there you have this to say:

> "The following Tables show only the Montana Power Company's present market requirements."

You see the paragraph I am referring to, the second from the bottom?

A Yes, sir.

Q And that refers, of course, the second paragraph there at the

bottom refers to these two Tables that you mention, that is Tables 6 and 7, those are the Tables that you refer to?

A Yes, that is correct.

Q Now, looking at the Table on page 7?

A Yes.

Q As I understand it, for 1951 you contemplate a supply from Canada of 600,000 Mcf?

A That is correct, yes, sir.

Q Yes?

A That is the way that this Table is set up. Actually, under the permit that will not be possible now with any date that we will have for instituting service.

Q But, as I understand the Table here, your plans were that 600,000 cubic feet of gas would be taken from Canada in the year 1951, and the corresponding items across the page of 10,985,000 in 1953, 12,204,000 in 1957, and so on?

A That is correct.

Q That is correct?

A Yes.

Q Now, when would you expect service to commence in 1951?

A Well, the estimation or the assumption had to be made that we would have the approval from the Federal Power Commission to start, and this Table was set up on the basis of approximately 20 days' . . .

Q I see?

A . . . service in December of this year.

Q But at the moment, I take it, that you have not received a permit from the Federal Power Commission?

A No, we have not. The oral hearings are December 7th.

Q That hearing is to be completed December 7th?

A The oral hearings are December 7th. As I understand it, that is the final step prior to the issuance of an order of some sort.

Q So that up until such time as you know the outcome of that application, you are not in a position to know whether any gas will be delivered from Canada in 1951?

A This was an estimate that was prepared to attempt to show the, what appeared to be reasonable at the time, at least.

Q Yes. As I understand it, this hearing that takes place on the 7th of December, that is the time when argument takes place following the evidence which was given some time ago in, was it Billings?

A That was my understanding, but that is a little out of my field.

Q But, in any event, you do not anticipate that you will be able to do anything until after whatever argument is necessary, and until the permission is given?

A That is correct.

Q And nothing will be done unless and until the Commission does give a permit?

A That is correct.

Q Then, of course, superimposed above all that, is the question of whether or not this permit now being applied for is granted by this Board, or were you thinking merely of the use of the gas under the special Act?

A The use of gas under the present Federal Power Commission permit that is related to the special Act here, under limited export.

Q Now, as I understand it, the matter with which the Federal Power Commission is now dealing is the use of the gas in the United States, export of which was permitted by special Act of the Province of Alberta?

A I think that is correct, yes.

Q And the application you are now making is with a view to obtaining the right to export additional gas beyond that permitted under the special Act?

A Well, the purpose of this application is for general export from the Pakowki Lake area, as defined in this submission.

Q So that would be the export of gas over and above that permit under the special Act?

A Well, it is in the request for permission to export in accordance with what we have shown here as our market requirements, and for an export permit from Pakowki Lake area, and I do not think it has any relationship to the special Act.

(Go to page 2350)

Q I am wondering, let us assume that this present application of yours were granted, would you t en consider that the permit allowed you under the special legislation would be absorbed in this permit?

A Well, my understanding is that if a general export permit were granted that would take precedence over the special legislation. Now, I am not sure that that is correct.

Q Well, I am just wondering what your company has in prospect, whether or not it would consider, if this permit were granted, that this would be something in addition to the special Act, or whether the special Act would be absorbed in that?

A The intent of this present application is not to compound the permits, if that is what you mean.

Q You would not take what you got out of the special permit and add this to it?

A No, that is not the intention at all.

Q Your intention is whatever permit you have under the special application be absorbed in this permit, if granted?

A As I understand the special permit, the granting of a general permit for export would void the special permit at that point and we would then proceed under application that we are now requesting.

Q You would not then feel that you were acting under the special legislation at all, in the event of this permit being granted?

A Well, that would be our understanding of it, yes.

Q Of course, insofar as the use of gas from Canada in the United States in 1951, then, it would not depend upon this permit being granted because you have already got rights under the

special legislation?

A That is right, yes.

Q So that the use of Alberta gas in the United States depends solely on what action the Federal Power Commission might take?

A That is right.

Q Now, in view of the fact that argument before the Power Commission does not take place until the 7th of this month, do you think there is any likelihood of your using any Alberta gas this year in the United States?

A I am hopeful there is, but we will have to let the Federal Power Commission decide that, I guess. I do not know what their procedure is or what we can expect in the way of a decision, when we can expect it.

Q I suppose you have had experience with previous applications before that Board?

A No, sir, not in the gas department.

Q The Federal Power Commission, Montana never made application?

A Electricity, yes. With our Inter-State Gas Company, no.

Q I would expect the course would be that argument takes place and the Board reserves and in time comes down with a written opinion and that passes on for special -- I think it is a Presidential permit, or something like that?

A Yes. Presidential certificate, I understand, in addition.

Q All of which would take some time, I presume?

A Well I am not prepared to hazard a guess on that.

Q Now, I am referring again here to page 3 of your written submission, and in that statement, the last paragraph on the page, the last sentence says this: "They do not include any increase in use by present large industrial customers, any

new large industrial customers, or any service to communities not now served"?

A Yes.

Q Now, if I understand that rightly, it would mean that the system as shown on page 5, that is this map, will stay as it is, that you are not going to change the picture materially?

A There is no major extension planned under the special export permit that has been granted by Alberta.

Q That is to say that so far as the gas you are getting under the special legislation, you are quite satisfied that it is quite sufficient to meet all the requirements of your system?

A I do not think that is quite the statement of it. It is designed to supply the Anaconda Company.

Q It is designed to supply the Anaconda Company?

A Well, the volumes of gas removed from the Province of Alberta would be.

Q Under the special permit?

A Under the special permit.

Q Yes, but you do supply the Anadonda Company with this existing system that is shown on page 5, do you not?

A That is correct.

Q So that I take it, with the gas you are getting under the speci permit you are able to serve the Anaconda, which is included in the system depicted on your map at page 5?

A Yes, sir.

Q In other words, that when you take your gas from Alberta under the special permit you are able to serve the Anaconda and all of your other customers that now exist?

A Well, it is going to be difficult to tag each molecule of gas

going down the line. I think the situation that the Montana Power Company was faced with was the very real decision to continue to serve the Anaconda Company or not, and the fact that, assuming we have favourable Federal Power Commission approval, the export from Canada will enable us to continue that industrial load. Without this Canadian gas we would not.

Q What I mean to say, Mr. Stadler, is this, look at the system as it is shown on page 5. As you are now, with the gas that you have got from Alberta under the special permit, you are able to supply the Anaconda with its needs and meet the requirements of your system as shown on that map, isn't that so?

A Well, as a system I think that is a correct statement, but the export permit, the special export permit from Alberta, permits serving that system only by virtue of the fact it is approximately equal, it is slightly less than the requirements of the Anaconda Company, the estimated requirements.

Q The point I am making, Mr. Stadler, is this, that your need for gas exported from Alberta, in addition to or beyond that allowed by the special permit, allowed you by special legislation, your need for that extra gas is only incurred if you extend the services of your system to customers beyond those you are now serving?

A The need? I do not believe that is correct, sir. Even without the volume of gas permitted under the special permit I think it is our considered judgment that the volume of reserves available to the Montana Power Company are still not adequate for the market that we would have, less this major industrial.

Q Well, let us put it another way, Mr. Stadler. I take it that the Montana Power system, as shown on page 5, is the same system that you had in operation and contemplated to have in operation when you made application for the special permit that you got by way of special legislation, isn't it?

A I do not know that that is technically correct. I do not think we made application for special permit. Permission was granted under special legislation.

Q That is correct, and then after that special permit was granted by legislation of the Province of Alberta, it was necessary for you people to apply before the Federal Power Commission?

A That is correct.

Q And that hearing took place in Billings about what, six weeks ago?

A In September, yes.

Q And you then had to appear before that Board and give them full information as to what you propose to do with this gas?

A Under the special permit, yes, sir.

Q And you had to go before the Federal Power Commission and show them just what your system was and what its then needs were?

A That is right.

Q And the system that you presented to the Federal Power Commission would be the system that is shown at page 5 of exhibit 79?

A I believe that is right.

Q And evidence was given before the Federal Power Commission to the effect that with the gas coming from Alberta under

the special permit, the needs of your system could then be adequately met?

A I think the evidence would show that the only way we could continue serving the Anaconda Company was by having the gas permitted in the special permit from Alberta.

Q That is correct, but you also showed the Federal Power Commission that with the gas from Alberta under the special permit and the reserves that you have that you would then be in a position to service the Anaconda, and at the same time maintain your then-existing system?

A That was the intention of the company, at least.

Q That is what the company went before the Federal Power Commission to prove?

A Yes.

Q In other words, at the time the Montana Power Company was before the Federal Power Commission in Billings, six weeks ago, its purpose was to show that Federal Power Commission that its supply of gas, including the gas from Alberta under the special permit, was sufficient to meet the needs of your company?

A I do not think that is correct. I think that the purpose of the Federal Power Hearing, or what it was designed to show as far as our submissions were concerned, was the necessity for importing the volume of gas permitted under the special Act of the Alberta Legislature, to enable us to continue the Anaconda Company and, in the absence of that gas, we were not in a position to continue it, and even with that volume subtracted from our market that our reserves were still not too large, in fact they were inadequate.

Q But your object before the Federal Power Commission was to

show that with the gas from Alberta under the special permit, you then had an adequate supply that would make this system function?

A Well, I am not sure I understand what you intend by "adequate supply". We showed that under this arrangement, by bringing the volume of gas permitted under the special permit into our system, that we would continue to operate the present system including the Anaconda load.

Q That included normal increases that would occur in your business?

A That included normal growth, yes.

Q So that your evidence, then, before the Federal Power Commission, if I understand you right, may be summarized in this way --

MR. MACLEOD: Did this witness give the evidence?

MR. MILVAIN: I think he did, and he can correct me if I am wrong.

THE WITNESS: No, I did not give it.

Q MR. MILVAIN: You have not heard my question so you do not know what it is.

A I am just answering whether I gave the evidence or not.

Q What evidence are you talking about now?

A Any evidence to the Federal Power Commission.

Q Your company gave evidence to the Federal Power Commission?

A That is right.

Q And you are aware of the evidence that it gave?

A I think I am, generally.

Q You were present during the whole of the hearing, weren't you?

A I was in Billings during that time.

Q And probably played your part in developing the evidence that was led there with regard to market requirements?

A That is right.

Q So that you have a full familiarity with the market requirement evidence which was given before the Billings hearing?

A I think that is correct.

Q Now, then, I am coming back. I think I summarized what you have told us here in this box properly and if I am wrong you can correct me, but the evidence given before the Federal Power Commission in Billings on behalf of your company may be summarized in this way, that that evidence indicated that with the gas from Alberta and your reserves in the United States you then had enough supply of gas to meet the requirements of the Anaconda, to meet the requirements of your then-existing system with its normal growth, isn't that right?

A I think that should be qualified to this extent, that it was the announced policy of the company to continue the Anaconda Company, service to the Anaconda Company, if volumes of gas as permitted under the Alberta Act were also permitted under the decision of the Federal Power Commission. I think that question was also raised about the adequacy of the future reserves.

Q I would just like you to look at page 7 of this last exhibit 79.

MR. MACLEOD: It is not in evidence yet.

MR. MILVAIN: Isn't 7 in?

MR. MACLEOD: Oh, pardon me, that is right.

Q MR. MILVAIN: 7 is one of the tables you refer to, Mr. Stadler. I would just like to deal with the year 1953

for a moment. You will notice on page 7 you show your annual requirements as being 22,340,000?

A Yes, sir.

Q And your peak day requirements as being 113,900?

A Yes, sir.

Q Now, at the time the Billings Hearing took place, the evidence of peak day requirements, I put it to you, was 110,000?

A That is correct, and that was on the 14.9 pressure base.

Q That is correct. And again looking at the supply from U.S. sources on page 7 you show the annual as being 11,355,000, that is correct?

A Yes, sir.

Q And the peak day at 66,870?

A That is correct, yes sir.

Q Now, I put it to you that the peak day requirements shown at the Billings Hearing were 71,000?

A Well, I would have to check that figure if there is a discrepancy there.

Q I think that probably I can show you a copy of one of your exhibits down there and you may get it from there. I am showing you, Mr. Stadler, what was exhibit 42 in the Montana Hearing. If you look at 1953 and total the figures across there, they come to 71,000?

A That 71,000 is as opposed to the 66,800 we are talking about here, is that your question?

Q Yes?

A I do not think that difference is very significant, but I do not have any answer for it. I mean, I am not sure just why there should be a change there.

Q Well, then, if we can put this straight we can summarize it in this way, Mr. Stadler, that at the time of the Billings Hearing the evidence as to peak day requirements which would be met from United States sources was 71,000?

A Apparently, from that exhibit. Yes, that is right.

Q Whereas the peak day requirements met from U.S. sources, as shown on page 7 of exhibit 79, is 66,875?

A That is not a whole lot of difference, but if there is some need to reconcile that, I will try to find that out.

Q There is that difference very patently?

A Three million feet, two million feet . . .

MR. C. E. SMITH: Is that some exhibit put in by this man, his company, or what is it?

MR. MILVAIN: This was an exhibit put in by the Montana Power Company before the Federal Power Commission hearing in Billings last September.

THE WITNESS: It was in September, yes, sir.

MR. C. E. SMITH: I am not sure that the witness agrees that it is such or is an exhibit.

THE WITNESS: He is showing me what is purporting to be exhibit 42, which I assume is correct.

Q MR. MILVAIN: You assume it is a copy of exhibit 42 that was put in by your company?

A It appears to be.

Q Before the Federal Power Commission in Billings?

A That is correct.

MR. C. E. SMITH: That is all I wanted for the record.

Q MR. MILVAIN: And you also agree that the evidence put in by your company before the Billings Hearing was to the

effect that peak day requirements would be met from U.S. sources to the extent of 71,000 per day?

A I think that exhibit is also entitled "Minimum", isn't it?

Q "Estimated Minimum Gas Requirements."

A I think that might have some significance in that, and as far as the discrepancy between the three or four billion feet there, I am not aware of just what it is. I do not think it amounts to very much.

Q And you will also agree that the evidence given by your company before the Federal Power Commission in Billings last September was to the effect that its total peak day requirements were 110,000 as against the 113,900 shown on page 7 of exhibit 79?

A Oh, I think that is correct. If you apply the factor for the difference between pressure bases, 14.4, as requested by the Board for this submission, I think that will correct that, won't it? If you apply 1035 to 34-something, to the other total, I think you will come out with 113.9. It is the same figure as far as I know.

Q As I understand your present application to this Board, you are indicating a shortage of some 8,025 Mcf, 7,025, to meet your peak load requirements?

A You are talking about 1953 again?

Q Yes?

A The 7,000 is based on what?

Q That is assuming you get 40,000 from Canada. You see, if you look at this page 7 you find that you are getting a peak day supply from Canada in 1953 of 47,025?

A That is correct.

Q Under your special permit you are allowed 40,000?

A That is right.

Q So that there would be a deficiency of 7,075, wouldn't there?

A That is right.

Q Now, if you take your increase in peak day requirements shown on page 7 over what you showed in Billings of 110,000, you get a difference there of 39,000, don't you? Subtract 110,000 from 139,000.

A We are talking about different pressure bases. We had better get that straightened up.

THE CHAIRMAN: Just what is the purpose of this examination? I fail to see how it has any bearing on the present application at all.

MR. MILVAIN: It seems to me it has this bearing, Mr. Chairman, that it seems rather peculiar that the Montana Company should appear before the Federal Power Commission in September and give requirement figures indicating that with the 40,000 coming from Alberta it can meet its requirements, and it comes before this Board and gives you requirement figures indicating a deficiency of some 7,025 on that one construction.

THE CHAIRMAN: This is a different application. The special Act limits the amount that the Montana Power Company would get. It has nothing to do with this application. This application is for a different amount of gas. The applicant has put in this exhibit to show what their requirements are no, and that is what the Board is interested in.

MR. MILVAIN: I see that, sir, but it seems to me that this is obvious too, that there must be something wrong when this company goes before one Board in the United

States and shows its requirements as being a certain amount and comes before this Board and shows its requirements as being something more to serve the same purpose.

THE CHAIRMAN: Isn't the one because of a limitation and the other is a permit for a much greater amount? I do not think the two are related at all, and that is why I would like you to explain the purpose of this cross-examination.

MR. MILVAIN: I think they are related to this extent, sir, that when this company, the Montana Power, went before the Federal Board in the United States, it had certain gas available to it, it had its own reserves, and it had the gas which it was permitted to take under a special permit from Alberta. It demonstrates to the Federal Power Commission that with those two supplies of gas it could then adequately meet its needs. In other words, it wanted to satisfy the Federal Power Commission it had a claim which the Federal Power Commission should approve as being a satisfactory one that would meet the needs of the system and of the customers. Now in doing that, they say, "We have peak day requirements of 110,000. We can meet those peak day requirements with the supply of gas we have got at home plus that which we get from Canada." On the other hand, they come up here across the border before this Board and they say, "Our peak requirements are not 110,000 but they are 113,900."

THE CHAIRMAN: Because the witness has explained there is a difference in pressure bases there, which will have to be ironed out. Also I say this is an entirely different application. One is limited under a special Act. I fail to see the relationship between this Federal Power Hearing in

Montana, dealing with the special Act, and this application we have before us now. I would like you to confine your cross-examination to this exhibit here and to the market requirements as set out here.

MR. MILVAIN: Quite, sir, and I think it is extremely relevant, the cross-examination that I make. They show certain market requirements when they make application before the Federal Power Commission in September, they come here in November and attempt to show different market requirements, and I say: Why?

(Go to page 2364.)

THE CHAIRMAN: Well, they are asking for more gas. It is a different application, and they are asking for more gas.

A Well, sir. . .

MR.MILVAIN: To meet the same needs,sir.

THE CHAIRMAN: Beg pardon?

MR.MILVAIN: To meet the same needs. Well, I won't pursue this very much further, sir. I will just get this completed on the record. I may have misinterpreted the whole thing.

A Well, I think if you apply the factor for pressure base, I think you will find that there is no inconsistency in the annual load or the peak days that we have mentioned. It is a mathematical calculation that can be made, and I am quite sure that you will find that that checks out. It certainly should.

Q I am not sufficiently of an engineer to make that calculation. You think that it will reconcile itself?

A Yes.

Q Well, that may be so, Mr. Stadler, but it would seem to me that from the evidence you gave just a moment ago when I asked you the question, that that evidence was that all of the material and knowledge that you needed to determine your market requirements were known to you, as you have told me, some time around the end of July?

A That is correct.

Q So that the same knowledge would have been in your mind when you appeared before the Federal Power Commission as is now in your mind when you appear before this Board?

A I think that you will find that if you apply the factor

of 1.0347 to the 110 million before the Federal Power Commission, that you will come out with the 113.9. This is based on 14.4, to comply with the requests of this Board, and the other was based primarily on our records for 20 years and was got at 14.9.

Q That may be the explanation, Mr. Stadler. The figures, as they came to my mind, required some reconciliation. I could not understand why your peak day requirements were higher on this application than they were on the application before the Federal Power Commission to serve the same system?

A I think if you will make that check, I think you will find that that answers the question. It should anyway.

Q Well, I will put it this way, that the only explanation you can give for the discrepancy would be the change in the pressure components.

A I do not consider it a discrepancy. We are trying to apply the components asked for here. We are trying to put apples and oranges here into their component parts.

Q Now, let us assume that the pressure components were the same, and that they are to be compared on the bsame basis. When you said to the Federal Power Commission that in order to meet peak day requirements, your peak day requirements were 110,000?

A That is correct.

Q That was to serve this same system that you are talking about now before this Commission?

A That is exactly right.

Q So that it would require considerable explanation to explain why your peak requirements before this Board, to

serve the same system, would be 3900 more than they were when you were giving evidence in Billings?

A Well, the 3900 for an individual peak day, if there is a discrepancy there, and I am not aware that there is or what it is now, I do not think it is a very significant figure.

Q We will put it this way, that if you are right in your estimate of your peak day requirements in Billings to serve this system, the requirement was 110,000?

A That is right.

Q Now, I am saying, let us assume that the pressure basis is the same, you tell me it is not, but assuming it is the same, there would be some explanation required as to why you would come before this Board and say that your peak day requirements were 113,900?

A I think that is right.

Q So that you tell me now that the only explanation that you can think of of the difference is the difference in measurement of pressure?

A As far as I know, that is the only difference.

Q And the same thing would be true with regard to the supply of peak day requirements coming from United States sources and coming from Canadian sources?

A I think that should be right. That submission there is the minimum peak day requirement.

Q That is right.

A Whether there is any judgment figure in that, I do not know. I do not know of any difference.

Q Because when you come to the source of supply and the requirements to meet peak day, with regard to the evidence

in Billings, the evidence was that 71,000 of peak day requirements would come from United States sources, whereas in your submission before this Board you show 66,875, or a difference of 4125?

A Well, if that difference is important, I will have to check that. I do not know if there is any obvious discrepancy.

Q I mean, your only explanation is the difference in pressure measurement?

A I am not sure of that, but the figure on markets and annual peak day for the Montana Power System, I am positive is readily explainable by the application of the factor which takes into consideration the pressure base.

Q But, Mr. Stadler, if I were right in saying that your annual peak day requirement was increased in this submission and your United States supply decreased in this submission or application, in your evidence before this Board, then it would wipe out the necessity for any gas beyond the 40,000 that you get under the special permit?

A Oh, I do not think you can apply that. If you are going to talk about the F.P.C. hearing, that was a hearing to determine the, to get a decision on whether or not we would be permitted to import gas into the United States for a limited period and for a special purpose. It does not take into consideration the system requirements beyond 1955 or 1956. The expiration date of the permit, I think, is the spring of '56.

Q And, of course, you have to satisfy the Federal Power Commission that with your supplies of gas you could give an adequate and proper service?

A Our submission to the Federal Power Commission was, I think,

strictly on the basis that in the absence of being permitted to import the gas, which the Alberta Act allowed, that we would not be in a position to continue the load of the Anaconda Company, and there was a judgment of the Company that we would carry on in that type of operation for the limited period.

Q Now, is it the intention of your Company then, assuming this application be granted, to use the additional gas from the 40,000 per day that you get under the special permit to serve these new areas you speak of, Missoula and other places?

A I think that would be part of the future program of the Power Company, yes.

Q Because when you were giving evidence before the Power Commission, my understanding was that you could meet your Anaconda load and your normal expansion by getting 40,000 to meet the peak day requirements from Alberta?

A I do not think it was a question of showing how we could meet it; it was more a question of showing we would not be able to meet it unless we were permitted to bring the gas in.

Q But by bringing it in you would then meet it?

A Well, we would meet it in that fashion.

Q The one follows the other?

A I do not think it is quite the same, because it has to take into consideration the system over a great many more years than four or five.

Q And on this page 7 of your estimated market requirements, were the requirements of Missoula and these other places

included?

A No, sir, this is the present system of the Montana Power Company.

Q No expansion shown at all?

A Normal expansion, but no major expansion.

Q I realise that. The normal expansion that takes place in your system?

A Yes, on the present system.

Q But no additional expansion?

A That is right.

Q Has any investigation been made as to what additional supply would be needed to service Missoula?

A No, we have an approximation of what the market requirements are in the Missoula tap.

Q Do you know what the additional gas will be in addition to what you have now in order to do that?

A No, sir, we have put no figure on gas supply.

Q Under the special permit, would you be able to meet your requirements for the five years contemplated by that permit?

A We think we will. It means taking more gas from Cut Bank than we would like to.

Q So that the situation would be that you would be able to meet your requirements with the gas that you get under the special permit from Alberta up to the end of the fifth year, up to the end of the 5-year period contemplated by that 5-year permit?

A Yes, I think that is right.

Q That is all, thank you, Mr. Stadler.

MR. MACLEOD: May I ask a question, sir, which I should have asked first?

THE CHAIRMAN: Yes.

.....

RE-EXAMINATION BY MR. MACLEOD:

Q In those Tables 6 and 7, for 1951, what figures were those arrived on, or on what basis were those figures on, on the basis of your special permit?

A Well, it was presupposed that we would have had a favourable decision from the Federal Power Commission in sufficient time to permit us to withdraw this volume of gas, which would be in accordance with the terms of the special Act, the special permit.

Q And none of it was under any general permit?

A No, sir, not in 1951. We assume here that if a permit were granted for general export in time to permit 1952 consideration, then the 1953 figures would be under general export.

Q And 1951?

A Is under the special permit.

Q Is under the special permit?

A Yes.

Q And '53 is the first year under the general permit?

A Yes, 1953 is the first year under the general export permit.

Q And I presume that before the Federal Power Commission you were dealing merely on the basis of a limited permit?

A Strictly with the limited permit, yes, sir.

Q Thank you.

.....

CROSS-EXAMINATION BY MR. MARTLAND:

Q Mr. Stadler, none of the gas from these Alberta fields would be used for the benefit of Canadian consumers at all, would it?

A As we presently conceive it, only to the extent of anybody living along that transmission line.

Q Have you given any indication as to how many it would serve?

A No. It would be very few.

Q I wonder if you could tell me this: Assuming the Anaconda load cut off, how long would your Montana reserves provide gas for your present system?

A I think that on the basis of our deliverability, that it would be about 10 to 12 years, if I remember correctly. If it is important, I would prefer to check it.

Q That is on the basis of your deliverability?

A I think that is correct. I would want to check that if it is an important figure.

Q All right, thanks.

MR. MAHAFFY: If I may ask a question or two, Mr. Chairman?

THE CHAIRMAN: Yes.

CROSS-EXAMINATION BY MR. MAHAFFY:

Q As I understand the description of the system, Mr. Stadler, you have three companies handling the gas, would you?

A That is right.

Q A Provincial company gathering in Alberta?

A Yes, that is right. The Canadian-Montana Gas Company.

Q And that Canadian company would be transporting from the fields to the border?

A Yes.

Q And there they would make delivery to the Montana Power?

A Yes, there they would make delivery to the Montana Power.

Q Now, what is the length of the line that the Canadian company would be operating, the transmission line?

A It is about 18½ miles.

Q About 18½ miles?

A Yes.

Q Now, are these three companies inter-related?

A They are wholly-owned subsidiaries, the two Canadian companies are wholly-owned subsidiaries of the Montana Power Company.

Q I see. They are both wholly-owned subsidiaries of Montana Power?

A Yes.

Q Now, in the event, Mr. Stadler, that it was deemed advisable to have the gas in Alberta handled by a more local company, assuming that company could deliver the gas at the same price as your subsidiaries at the International Boundary, would there be any reason why you should not buy from this gathering, or grid company, whatever you want to call it, rather than from your subsidiaries?

A Oh, if the price is the same, and the conditions of - I mean, other conditions that might relate to the delivery of gas to us, were the same, I do not know that there would be any particular difference to us. We are interested in acquiring additional gas.

Q It is gas that you want at a price, isn't that right?

A That is correct.

Q Thank you.

RE-EXAMINATION BY MR. MACLEOD:

Q Now you would have to sell to that intermediate company first, wouldn't you?

A I beg your pardon?

Q You would have to sell to that intermediate company first, wouldn't you?

A We are talking about gas at the border, as I understand it.

Q But you own the gas?

A We own it, that is right.

Q So that you would have to sell it to Mr. Mahaffy's company and then buy it back from them?

A I am talking about the end point. We are not going to take a licking on one of the companies as an adequate substitute.

CROSS-EXAMINATION BY MR. MAHAFFY:

Q Well, who does own the companies now, Mr. Stadler?

A The companies?

Q I mean, the gas, I am sorry?

A The McColl-Frontenac and Union at the present time.

Q And they have made a contract to sell to Montana Power?

A That is right.

Q And is Montana Power going to sell it back to the Alberta company?

A No. As I said in here, the Canadian-Montana Gas Company will acquire the rights in the field.

Q The Canadian-Montana?

A That is correct.

Q Is that the Alberta company?

A Yes, that is the Alberta company.

Q So that the gas is changing hands quite frequently so far,

isn't it?

A It has always been in the family. It is always in the family.

Q You would not mind taking someone else in as a bedfellow if it seems necessary and advisable from the point of view of Alberta interests, as long as it does not increase the price of gas to you?

A I think expense is quite an item. I think that the expense would certainly determine that.

Q I appreciate that. Price is a big factor, isn't it, Mr. Stadler, but it is the gas that you want at a price?

A Gas at a price is important to us.

EXAMINATION BY MR. C. E. SMITH:

Q Mr. Stadler, I do not like to bore you with this, but to continue with what Mr. Mahaffy was talking about, I am at a loss with regard to the interests of McColl-Frontenac and Union Oil Company, as applicants. Quite frankly, if I understand this correctly, they have completely sold their interests to your people or your family, is that right?

A Well, we have a contract to purchase. Maybe Mr. Macleod can answer that better than I can. I mean, that the actual transfer or assignment of the interests in the Pakowki Lake area has not been accomplished yet.

Q That situation depends on the exhibit that was filed before, is that a fair way of putting it? I think there was only one copy of it.

A I do not know whether I understand your question with regard to that, Mr. Smith?

Q There was a contract filed before between McColl and you?

A Yes, the contract was filed.

Q What I am getting at is this: What is the status of the McColl-Frontenac and Union before the Board? Is it an applicant now?

A Well, McColl and Union technically own still these rights down there, although we had a contract to purchase, and upon favourable consideration from the Federal Power Commission.

Q The past tense is wrong where they say that they "were" the holders?

MR. MACLEOD: Mr. Smith, may I explain that?

MR. C. E. SMITH: Yes.

MR. MACLEOD: That was changed to the past tense because we found that there had been so many changes in the acreage. They did own, at the time that the agreement was drawn up, they owned the acreage referred to in the agreement, and certain changes have been made by them being surrendered and other lands acquired.

MR. C. E. SMITH: That language was used because of exhibit 80. Does that explain it now?

MR. MACLEOD: Yes.

MR. C. E. SMITH: I take it there is another witness being called for the second part of this submission, Mr. Macleod?

MR. MACLEOD: Two others.

MR. C. E. SMITH: Two?

MR. MACLEOD: Yes.

.....

EXAMINATION BY DR. GOVIER:

Q Mr. Stadler, can you tell us what proportion, if any, of the industrial market, which is referred to on page 6, would be represented by the use of natural gas as a chemical raw material?

A I do not know of any. I cannot think of any offhand.

Q You cannot think of any?

A No. I can check that, but I do not know of any.

Q Then it would follow that insofar as the requirement from Canada, given on page 7, is concerned, none of that so far as you know would be going for natural gas as a raw material?

A As a raw material, I do not know of any contemplated. There certainly is not in here, and I will correct that, if I can. I will check that and change it if I am wrong, but I do not know of any place where it is to be used as a raw material. I do not know of any contemplated market even in the future for that.

Q Thank you.

THE CHAIRMAN: Thanks, Mr. Stadler.

MR. MACLEOD: I will call Mr. John F. Dodge.

(Go to page 2377.)

JOHN F. DODGE, already sworn, examined by Mr. Macleod, testified as follows:

MR. MACLEOD: The Board are familiar with Mr. Dodge's qualifications.

THE CHAIRMAN: Oh, yes.

Q MR. MACLEOD: Mr. Dodge, you are responsible, I understand, for the Table which appears on page 8?

A Yes, sir.

Q To this Exhibit 79?

A That is correct.

Q Now, you have previously given a deliverability chart?

A Two, I believe. Well, no, I believe only one has been presented in evidence. There was one attached to a submission and that was revised some time about a year or so ago and this is an additional revision.

Q This is prepared by you, this Revision 8?

A Yes, sir.

Q Will you tell us why it was necessary to revise it?

A A further study of the Montana market and the availability of gas from Montana sources indicated that in the later years of this 20-year program here proposed the Montana sources would be unable to meet the demands which were predicated in the earlier schedule, and this revision was therefore made necessary following the preparation of Tables 6 and 7 by the Montana Power Company engineers, those tables which have just been presented by Mr. Stadler, and so this table, which I believe is Table 8 --

Q Page 8.

A Page 8 of this Exhibit 79 was prepared because of this

new distribution of source of supply as between the United States sources and the Canadian sources.

Q Now, Mr. Dodge, would you deal with anything you think may be necessary?

A Well, perhaps the Board would be interested primarily in matters of what was necessary to do in order to meet these increased demands.

Q Before you go further, is the same true what Mr. Stadler spoke of, 1951 having reference only --

A 1951, I think there was no question of deliverability, the quantities to be taken were substantially the same as were originally estimated and to be taken from the existing wells. By fields, the major change, I believe, is in the number of wells which now must be drilled in Smith Coulee and Manyberries. I think the original schedule, as I recall, had only two wells for a number of years in Smith Coulee and this schedule, the number must be increased to four wells by 1962. And you will observe by looking at Manyberries that the number of wells there increases to five in 1953, ten in 1957, twenty-five in 1962, and a total of twenty-seven wells by 1967. The rates of flow necessary exceed 15 per cent of the open flow capacity in each instance at various times during the 20-year schedule but in no instance exceed the original bottom hole differentials calculated as obtaining during the earlier years. The Board might be interested, it does not appear in the table, but I have calculated that for Pendant d'Oreille the last year it gets up to 62% of the bottom hole differential; for Smith Coulee we get up to 52% of the

original bottom hole differential; for Black Butte 64%, and 65% for Manyberries.

Another figure which might be of interest to the Board but which does not show in these tables is that by the end of the 20-year period we will have withdrawn in excess of 87% of the estimated total available gas from the major Montana source, that is to say, the Cutbank area. We will have withdrawn under those schedules 79% of the marketable gas from Pendant d'Oreille; 70% from Smith Coulee; 84% from the Black Butte field, and 68% from the Manyberries field. Those figures, I believe, are of interest in comparing the degrees of completion as of the various sources which this schedule contemplates. I think that is about all that I would consider new or pertinent in this schedule.

THE CHAIRMAN: Does anyone wish to question Mr. Dodge?

EXAMINATION BY DR. GOVIER:

Q Mr. Dodge, is this based on the same test data?

A Exactly the same test data. There have been no wells of significance drilled in the area considered proven. There have been step-out wells, I believe, which Dr. Beach testified to in a recent Hearing, but there has been no significant change in the information either as to reserves or flow capacities since our last presentation.

Q Thank you.

MR. McDONALD: Mr. Chairman, if I might interrupt Mr. Macleod. Mr. Dodge has prepared a submission in re-

gard to the Cobb pool, Cutbank area. I think possibly if Mr. Macleod would not object, we could put in the exhibit in the next fifteen minutes. Mr. Dodge wants to leave town tonight.

THE CHAIRMAN: Mr. Macleod has several witnesses in support of this submission.

MR. MACLEOD: One more.

THE CHAIRMAN: Would you prefer to go on with Mr. Dodge?

MR. MACLEOD: I would be prepared to accommodate Mr. McDonald if the Board wishes.

DR. GOVIER: Mr. McDonald, you may have to supply us with additional copies of the statement.

MR. McDONALD: Yes, sir. These were distributed, sir, about two weeks ago.

SUBMISSION OF JOHN F. DODGE RE PIPELINE PROJECT TO INLAND EMPIRE, UNDERGROUND STORAGE PLAN, COBB POOL, CUTBANK AREA, MONTANA, PUT IN AND MARKED EXHIBIT No. 81.

MR. McDONALD: Possibly I should state to the Board that this exhibit has been put in evidence as part of the submission of the Westcoast Company and a lot of the information has been supplied by the Montana Power Company and their affiliates, but it does not change the position as stated by Mr. Macleod, I believe it was some weeks ago, to the Board with regard to the Westcoast and the Montana Power.

Q If you would proceed, Mr. Dodge.

A In connection with the application of Westcoast Transmis-

sion Company Limited regarding a pipeline to the Inland Empire, I was asked to make a study of the economic and engineering feasibility of a gas storage project to regulate the variation in load on that proposed line. This exhibit consists almost entirely of a series of maps and diagrams rather than any written explanation, so I will simply point out a few of the salient features of the project by referring to the exhibit.

The first map shown in Exhibit 81 is a map of the southern portion of Alberta and the northern portion of Montana showing a pipeline, a proposed pipeline, dotted line from Pincher Creek to Whitefish and Kalispel with a lateral from Whitefish back to the Cobb pool which lies northeast of the Cutbank area, forms actually a part of the Cutbank area but is an individual pool in the Moulton sand. It shows also for purposes of reference the location of the presently constructed pipeline of Canadian-Montana and Montana Power Company from the Pendant d'Oreille area to the south end of the Cutbank field.

The next map shows the location of the Cobb gas pool, the heavy black line indicating the limitation of the pool as determined by Montana Power Company's geologists and by myself based upon a study of the well records and other geologic information available including certain dry holes that are shown on the map, and shows the location of the presently existing four completed gas wells and four additional wells which it is proposed to drill in connection with the operation of

this proposed project. There is also shown the location of a compressor plant and a dehydration plant centrally located within the area. I might say that that line, proven area line, includes about 2560 acres with sand thicknesses ranging, that is, productive sand, ranging from 0 on the limits of the field to about 30 feet in the central portion of the field.

The next illustration is a graph showing the surplus and deficiency in gas supply to the Inland Empire system in order to keep a uniform load on the source at Pincher Creek and to smooth out the demands of the proposed system by injection during certain portions of the year and withdrawal from storage during the other portions of the year. This particular graph was constructed for illustrative purposes and represents the portion as predicated for the fifth year. The total quantity to be stored is about 2 billion cubic feet and the total quantity to be withdrawn, of course, is about 2 billion cubic feet. The average quantities range, that is, monthly averages, range from 0 to a maximum of about 18 million feet per day, but Ford, Bacon & Davis' engineers estimated that it would be necessary to withdraw as large quantities as 46 million feet in an individual day, that is, that their peak day would require withdrawals of as high as 46 million feet, so that that figure has been given consideration in the design of the well lay-out, the dehydration plant and the compressor plant which is necessary to make this project feasible from an engineering standpoint.

The next illustration is a graph

showing the gas in place versus reservoir pressure in the Cobb pool. That figure should be considered -- I mean, that last should be considered in connection with the following graph which is a pressure versus withdrawal record for the past five or six years of the Cobb pool. I call to your attention the fact that the draftsman instead of drawing a smooth line through there and inking this drawing connected up the points. The projection to 16 billion cubic feet, the 14.4 is projected in a smooth line drawn through the points. The slope of the graph in the first of these two illustration shows actually the same volumetric considerations as shown on the second, but it has in addition a second set of abscissa below here showing what would be the effect of injecting 1 billion, 2 billion and so on cubic feet into the reservoir. It is tagged on there at the presently estimated reserve figure of approximately 13 billion, but that, of course, postulates any withdrawal and undoubtedly there will be considerable withdrawal before that time. It is used merely for illustrative purposes to show what would be the pressure in the reservoir if a given quantity of gas were stored or withdrawn. Incidentally, for the information of the Board, I might say that I made a volumetric estimate of the contents of the recoverable gas from this pool based upon 2570 acres for your closed line, 25% porosity, 25% interstitial water, and with the proper temperature, reservoir temperature, and pressures, and I came out with 15.9 billion cubic feet total gas. I hesitated to make a curve of that because it is a little bit too close.

That is principally for the Board's information. That was done by isopaching the gas sand and making use of the core data available.

The last page of this exhibit is a hasty economic survey aided by the engineers of the Montana Power Company. I estimated that approximately 2100 horsepower would be necessary to handle the maximum day input and maximum day withdrawal, and withdrawing the gas from this storage pool the wellhead pressure will be down around 370 pounds, as I recall, on a maximum day, and we estimated it would have to be compressed to 750 pounds. Instead of using 2100 horsepower I considered a compressor plant of about 2400 horsepower with small units would be much better adapted to the widely fluctuating load, and so I have made my estimate on the basis of 2400 hosepower at $250.00 a horsepower, four additional wells at $25,000.00, which is $100,000.00, dehydration plant $100,000.00, $50,000.00 for gathering lines, $10,000.00 for a measuring station. A field camp will be necessary here because the Cobb pool is quite remote from the town of Cutbank and in winter the roads are extremely difficult, so I allowed $75,000.00 for houses for compressor plant operators.

The fifth year assumes injection and withdrawal of 4 billion cubic feet, that is, injection 2 million cubic feet, which will have to be compressed to put it in, withdrawal of 2 billion cubic feet, so you have got 4 billion feet, and I used for one estimate 2½ cents per 1,000 cubic feet compression costs, which gave me

$100,000.00. Capital charges at 16% would be the total investment of $935,000.00, and is approximately $150,000.00 which gives a total cost for the proposed storage project of $250,000.00.

It will be recalled, perhaps, that the testimony of Ford, Bacon & Davis' engineers was based upon 25 billion cubic feet a year for the fifth year of operation of the Inland Empire project. This, then, is equivalent to adding 1 cent per 1,000 cubic feet to the over-all cost of operating the line for the storage project to smooth out the peak load.

I might say that in connection with this $100,000.00 operating cost I also considered it synthetic to build it up from labour and material and so on, and I did not go quite that high. I only get about $80,000.00 for a horseback figure and I consider that close enough. I think that is about all, Mr. McDonald.

Q MR. McDONALD: Just one item. I think there was discussion, was there not, that the $20,000.00 may be applicable to rental of the pool, or something of that kind?

A Oh, yes. This whole project supposes and contemplates the continued operation of the pool as something for the Montana Power Company. As a matter of fact, they would, during this five years of operation -- their schedules call for the withdrawal during peak days of 10 million cubic feet of gas a day for their purposes. I made an investigation of the royalty situation and so on there and I find that there is no provision in the current

leases for the storage of gas, but the worst that you could have happen to you would be that you would have to pay royalty to the land owners on that gas withdrawal. The royalty is equivalent to .625 cents per 1,000 cubic feet, so on the basis of 2 billion feet injected in this fifth year of operation the worst that could happen to you to pay for the use of the reservoir would be to have to pay the land owner about $12,500.00, and that comes well within the limits of my synthetic cost estimate as between that and $100,000.00. I do not know whether I make myself clear or not on that point. I have had considerable experience with gas storage projects. In one or two instances where it was impossible to obtain a concession from the land owner you simply had to go ahead and store the gas, then when you brought it out account to them as the gas produces, and that is about the worst situation you can have from a cost standpoint. In most cases it is possible to negotiate some type of agreement but in this tentative examination no such negotiation was assumed.

THE CHAIRMAN: Anyone wish to question Mr. Dodge?

CROSS-EXAMINATION BY MR. MILVAIN:

Q I was just wondering, Mr. Dodge, did you ever give any consideration to storing that gas in Alberta?

A Yes.

Q Serving the same purpose?

A It would not serve the same purpose. In the first place, the purpose of storing the gas in this location was to

have its point of, you might say, departure and return to the proposed pipeline well along the system where it would become more readily available. In the second place, there is no place in Alberta that would be feasible at all from an engineering standpoint to serve this line. Now, I have given consideration for storage projects for other purposes in Alberta but this particular thing, there just is not any place to put it.

Q This storage would not serve the people of Alberta at all?

A None whatever. It is fairly designed as a load smoothing function for the proposed Inland Empire line applied for by Westcoast Transmission Company.

Q That is all.

EXAMINATION BY DR. GOVIER:

Q Mr. Dodge, one or two things I wanted to ask you about. I wonder if you would elaborate a little bit on the comments you made that Ford, Bacon & Davis' engineers had suggested 46 million in an individual day, and although your chart only reflects 18, you felt it wise to design to 46.

A The way the draftsman projected that graph it is a little misleading. He brings it to a peak. Actually, it should come up by steps.

Q Those are monthly averages?

A Daily averages, millions of cubic feet per day by month, and peak days exist within that month which takes them from an average of 18 up to a maximum day of 46.

Q Mine doesn't say it is by the month, but that is what it means?

A Yes.

Q So this should be a step-wise graph?

A Yes. This was prepared in great haste about two weeks ago when we thought we would present it at one of my other trips here. The 46 million is a peak day during January, as I recall, and while the month would only be 18 million one peak day would be as high as 46, according to Mr. Sample and Dr. Hetherington.

Q For the month of September the chart should be a horizontal line going across at a level of 10?

A That is right. I am sorry this does not better represent it.

Q Another thing I was wondering about, Mr. Dodge. The next chart that shows the input and output of relationships for the Cobb field?

A Yes, sir.

Q You have a supplementary abscissa here showing gas stored and it looks as though the gas would be put in at a stabilized or at a minimum field content of 13 and some odd?

A Yes. It was contemplated in Dr. Hetherington's schedule that this system was going to have absorved something like 4 billion feet during the first four years of operation. I do not know whether you recall that or not, but I read his exhibit. We thought, or rather, I thought that continued operation by Montana Power Company of this project as a source of gas during the next four or five years combined with an absorption of about 4 billion cubic feet might not, according to arithmetic, take us back to

John F. Dodge,
Exam. by Dr. Govier.

about 13 billion at that time and then the injection of this 2 billion feet would start it around 13 billion and carry us up to approximately 15 billion.

(Go to page 2390)

Q DR. GOVIER: Well, let us assume that that is right, Mr. Dodge. What I was wondering about is this, what about five years later?

A Five years later we undoubtedly would be down, quite a ways down here.

Q By the amount of any net withdrawals?

A By the amount of any net withdrawals, but I thought that was just getting a little too . . .

Q A little too refined?

A Yes, a little too refined for the purposes that this thing was intended for.

Q But I take it it is correct, though, that your capital costs and so on are all predicated on maintaining a cushion of about 13 billion?

A Yes, that is correct. We figured, or I figured, that is to say, that I would have to have 8 wells to get out that 46 million plus the 10 million of Montana Power Company, that they might want, and the deliverability of those wells on a 25% open flow factor was about 7½ at these pressures.

Q At the producing pressures?

A At the 500 pounds.

Q I see?

A And I was shooting right in the middle of a situation where we would be putting gas in and taking it out, and it is pretty hard to figure just what plant you are going to have, or how you are going to operate, all 2400 horsepower, or to take out the 46 million cubic feet of gas, and receive it at the well head at 370 pounds and put it in the line against the then-assumed line pressure, and that was my peak condition that we designed for.

Q The other thing I notice that is conspicuous by its absence, is the capital cost of the pipe line?

A That is designedly done, because that was covered in Mr. Poor's submission, I believe, and all I was trying to do was to check the figure which Dr. Hetherington and Mr. Poor and Mr. Sample gave me, that they were going to allow 2 cents a thousand cubic feet for this storage and I only need 1 cent.

Q Actually, that line was only required if gas was to be stored?

A Yes, that is correct. And it really is a proper charge to the peak-smoothing operation; but, as I say, this particular assignment was to determine the validity of, the economic feasibility of the operation as a whole, and with the 2 cents that had been given to the Board as a proper charge for this operation, that that was a sound figure.

Q Yes, I recall that.

A You recall that, I believe. Actually we do not need 2 cents but we need 1 cent for this part of the operation.

Q Thank you.

MR. McDONALD: Dr. Govier, I might say that the capital cost in the exhibit covering the construction costs of the Inland Empire system was in the entire cost of the line.

DR. GOVIER: I recall that now, Mr. McDonald.

Q Thank you, Mr. Dodge.

THE CHAIRMAN: Thank you. The Board would like to meet with counsel of the interested parties at 9.15 tomorrow morning. We will adjourn until 9.30 a.m. tomorrow morning.

(Hearing adjourned until 9.30 a.m. December 4th, 1951.)

The Province of Alberta

PETROLEUM AND NATURAL GAS CONSERVATION BOARD

IN THE MATTER OF THE GAS RESOURCES PRESERVATION ACT

AND IN THE MATTER OF the application of Westcoast Transmission Company Limited and Westcoast Transmission Company Ltd. (Alberta Incorporation) for a permit authorizing the purchase and sale of Natural Gas in the Province of Alberta for transmission to points in the Province of British Columbia and the States of Washington and Oregon in the United States of America.

I. N. McKinnon Esq., Chairman

D. P. Goodall Esq.

Dr. G. W. Govier

Session:

Volume_____